

Coal Age

FOREMEN'S CLUBS . . .p. 74



JR v.532 July-Dec. 1948

UNDER PRESSURE 11 YEARS...STILL GOING STRONG

A Sun Oil Helps Keep Compressor on the Job 16 Hours a Day—No Hard Carbon Forms

The "lungs" of a forced ventilation system in a large industrial plant are two-stage air compressors—pumping air through the system at 300 pounds per square inch.

One of these compressors, now over 11 years old, has been running 16 hours a day since its installation. From the start, a Sun lubricant has been used to lubricate crosshead

and air cylinder. During the past five years there has been but one shutdown . . . and that occurred when a different brand of oil was used by mistake!

Operating on the Sun lubricant, the compressor is running as well today as ever. No hard carbon has formed. As a result of this record the plant has standardized on Sun

lubricants for all its air compressors and vacuum pumps.

This performance is typical of the advantages gained from "Job Proved" Sun lubricants in thousands of industrial plants. Further information can be had from any Sun Office. For a copy of the booklet "Lubrication of Air Compressors and Pneumatic Tools" write Department CA-7.

SUN OIL COMPANY • Philadelphia 3, Pa.
In Canada: Sun Oil Company, Ltd.
Toronto and Montreal

SUN PETROLEUM PRODUCTS
"JOB PROVED" IN EVERY INDUSTRY



tech



Dangerous business—being a human lightning rod

Koroseal is a typical example of B. F. Goodrich development

B. F. GOODRICH technical men have practically eliminated the hazard of electrical shock from high-tension trolley lines, through development of a U-shape of Koroseal* flexible material, unaffected by mine dampness and specially compounded not to conduct electricity. Trolley operation is unimpaired.

Higher insulation factor—Koroseal trolley guard has an insulation factor many times more than required for the average mine line voltage. Provides a wide margin of safety.

Better hang, more protection—Heavier edges and center piece make the

Koroseal trolley guard hang naturally in the U-shape that best shields the trolley wire, gives the miner the greatest protection.

Won't burn, rip, or rot!—Koroseal trolley guard will not burn unless flame is constantly and directly applied to it—burning stops the instant flame is removed. No cloth insert to catch fire from arcing trolleys. Won't rip—the heavier, thicker edges of Koroseal trolley guard make it almost impossible to tear. Has no cloth insert to separate and tear away. Won't rot—it resists the action of acid mine water, atmospheric gases, mildew and

damp, that corrode ordinary guards.

Specifications—Color: brown—Dimensions: 12" from edge to edge—Weight: ½ lb. per lin. ft.—Packaging: 100 ft. rolls, wrapped in kraft paper and protective burlap.

Ask your B. F. Goodrich distributor to show you Koroseal trolley guard, and many other B. F. Goodrich products that make mining safer and more profitable. *The B. F. Goodrich Company, Akron, Ohio.*

*Koroseal—Trade Mark, Reg. U. S. Pat. Off.

B.F. Goodrich
Koroseal Trolley Guard

Make no mistake

FOR
INSTANCE...

Are you mistaken about



**THAT
\$24
?**

History tells us Peter Minuit paid the Indians 60 guilders, roughly \$24, for Manhattan Island. Now gossip has it that Pete paid the money to a roving tribe who just paddled over from somewhere around Brooklyn to see him land. They weren't the real real-estate owners . . . and later Pete had to pay a lot more money to other tribes to clinch the deal!

And speaking of money . . . what does coal-mine-machinery Lubrication really cost you? Answer — the cost is insignificant compared to results, when you use a Grease specially made to do its job **RIGHT** — in short, **HULBURT QUALITY GREASE**. That's our whole story — the **QUALITY** of Hulburt Grease, a product made *solely* to make coal mining machinery run better. At your Service . . . Hulburt Lubrication Engineers, who'll go down in your mine and advise better ways to apply **HULBURT QUALITY GREASE**.

HULBURT OIL & GREASE COMPANY—PHILADELPHIA, PENNA.

Specialists in Coal Mine Lubrication

for Coal Mine Lubrication

use



HULBURT

Quality **GREASE**

PROVEN BY PERFORMANCE

HAZASHEATH SPIRALWEAVE

... underground cable with
TRIPLE PROTECTION

Hazasheath Spiralweave cable is protected against moisture encountered in conduit, direct burial in the ground, and in hanging inside the mine. Mechanical protection is also afforded by these three construction features.

1. Hazard Submarine rubber insulation of high rubber and low sulphur content, developed particularly for non-leaded underground cables; strong, resilient, moisture-resisting insulation.

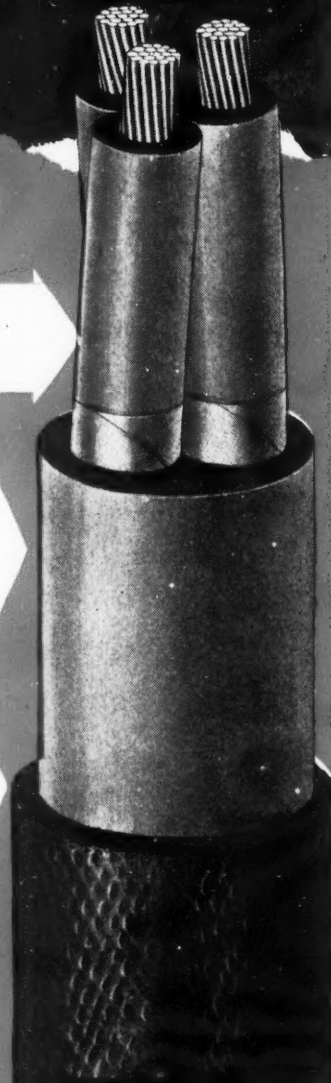
2. A tough, thick, long lived, mold-cured rubber jacket of dense Hazasheath, similar to a solid truck tire in strength and wear-resistance. It resists chemicals, heat and rough handling as well as moisture. It is proof against the effects of soil acids and alkalies and is extremely tough. Cushions the insulated conductors against falling rock or other injury.

3. Loom-woven Spiralweave covering, treated for fungus-resistance, and thoroughly waterproofed, forms a strong outer protective covering of Fire-hose type. Neither lead sheath nor wire armor is required making Hazasheath lighter in weight, easier to handle, and moderate in cost.

Ask a Hazard sales engineer to tell you how Hazasheath Spiralweave Cables will render you more efficient operation. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

HAZARD

insulated wires and cables for every mining use



4394



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July, 1948 • COAL AGE

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Director of Circulation, COAL AGE
330 West 42nd St., New York 18, N. Y.

Please change the address of my COAL AGE subscription as follows:

Name

Old Address

New Address

New Company Connection.....

New Title or Position.....

ROCKMASTER Precision Controlled BLASTING

not only saves money
but avoids plenty
of trouble



How to blast over 70 holes in one "shot" in a spot like this, without disrupting train or auto traffic? Even the most skilled blasting men will admit it's a ticklish problem. But Rockmaster blasting methods, under skilled Atlas technical direction, did the trick by controlling throw to an extent that seemed impossible!

With Rockmaster, the blaster can shoot his drill holes at controlled millisecond intervals. In this case, he wanted good breakage of the rock for hauling, but above all, he wanted control to prevent its being thrown on the busy tracks and roadway below.

So he timed his shot like a quarry-type blast—in reverse! Notice that the back row shot first—then the middle row, milliseconds later—and the front row last. Thus, the front row was made to throw much of its power toward the rear instead of out over the tracks and road.

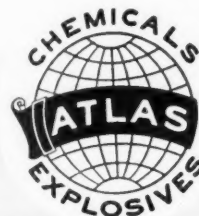
Maybe your job calls for *more* throw instead of less. Rockmaster gives you the whip-hand over the situation. And helps control objectionable noise and vibration, too—an important feature when blasting must be done near inhabited buildings.

Call in your Atlas representative and find out what Rockmaster can do on your job—whether it's mining, quarrying or construction work.

"ROCKMASTER"—Trade Mark
Manasite: Reg. U. S. Pat. Off.

ATLAS

EXPLOSIVES
"Everything for Blasting"



ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco

ROCKMASTER GIVES
YOU THE GREATER
SAFETY OF MANASITE
DETONATORS



*Less Bark...
More Bite*



Remember, the Atlas Rockmaster Blasting System also incorporates Atlas Manasite. This means decreased sensitivity to impact and friction—no sacrifice of efficiency but less chance of accident!



YOU WASH AND WE'LL DRY...



Wash your fine coal any way you want to — but let the BIRD Continuous Centrifugal Filter do the drying.

Here's why:

The BIRD delivers the dried fines just right for blending or for thermal drying. Not more than 6 to 10% moisture remains in the coal.

The BIRD gets the water so clean it can be used again and again. In a closed circuited plant it contains somewhere around 5% solids.

The BIRD gives you the simplest as well as the most efficient system. If you clean your fine coal separately, it can be fed directly to the Bird without settling or thickening. If you do all your cleaning at one time and settle the fine coal in a sludge tank, you simply feed the settled coal and a large volume of overflow to the Bird, thus working towards a closed system.

The BIRD handles 40 tons or more per hour, continuously, for long periods without shut-downs or overhaul.

Let us tell you more

BIRD MACHINE COMPANY
South Walpole • Massachusetts



The BIRD Centrifugal FILTER



The Governor of Colorado *invites You*



THE STATE OF COLORADO
EXECUTIVE CHAMBERS
DENVER

WILLIAM LEE KNOUS
GOVERNOR

To American Industry:

Look long at Colorado.

A vigorous, young state, awake to its opportunities yet aware of its needs, will challenge your attention and stimulate your imagination.

Natural resources we have in abundance with the water and power for their development. Our labor force is highly adaptable, our markets are rapidly expanding.

Our health-giving climate, our scenic setting make Colorado a soul-satisfying home for you and your families.

And most important — we know where we're going! Our leaders in business, industry, agriculture and education, through their Resources Development Council, are charting a course toward a sound, stable future for our people.

Look long at Colorado — it offers you much!

Lee Knous
Governor



Lee Knous

* One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.

Unite with Union Pacific in selecting sites and seeking new markets in California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, Oregon, Utah, Washington, Wyoming.

*Address Industrial Department, Union Pacific Railroad
Omaha 2, Nebraska

UNION PACIFIC RAILROAD

Road of the Daily Streamliners



Safety is the feature you look for in all coal mining equipment and accessories. With portable cords and cables the safety angle is paramount. That is why all TIREX Cords and Cables for coal mine service have the marking P-101 molded onto the cured-in-lead Selenium Neoprene Armor.

This marking is your assurance that TIREX Cords and Cables comply with all the requirements of the Department of Mines, Commonwealth of Pennsylvania. It means that the cable will not support combustion.

TIREX was the first rubber-jacketed heavy duty cord or cable in the field. During nearly thirty years it has remained the leader. Simplex-TIREX Cords and Cables are stocked by the many TIREX distributors located throughout the mining areas.

*Simplex*_____

WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

Medium Size Motor Grader



BRINGS YOU . . . HEAVY-DUTY PERFORMANCE WITH NEW ECONOMY

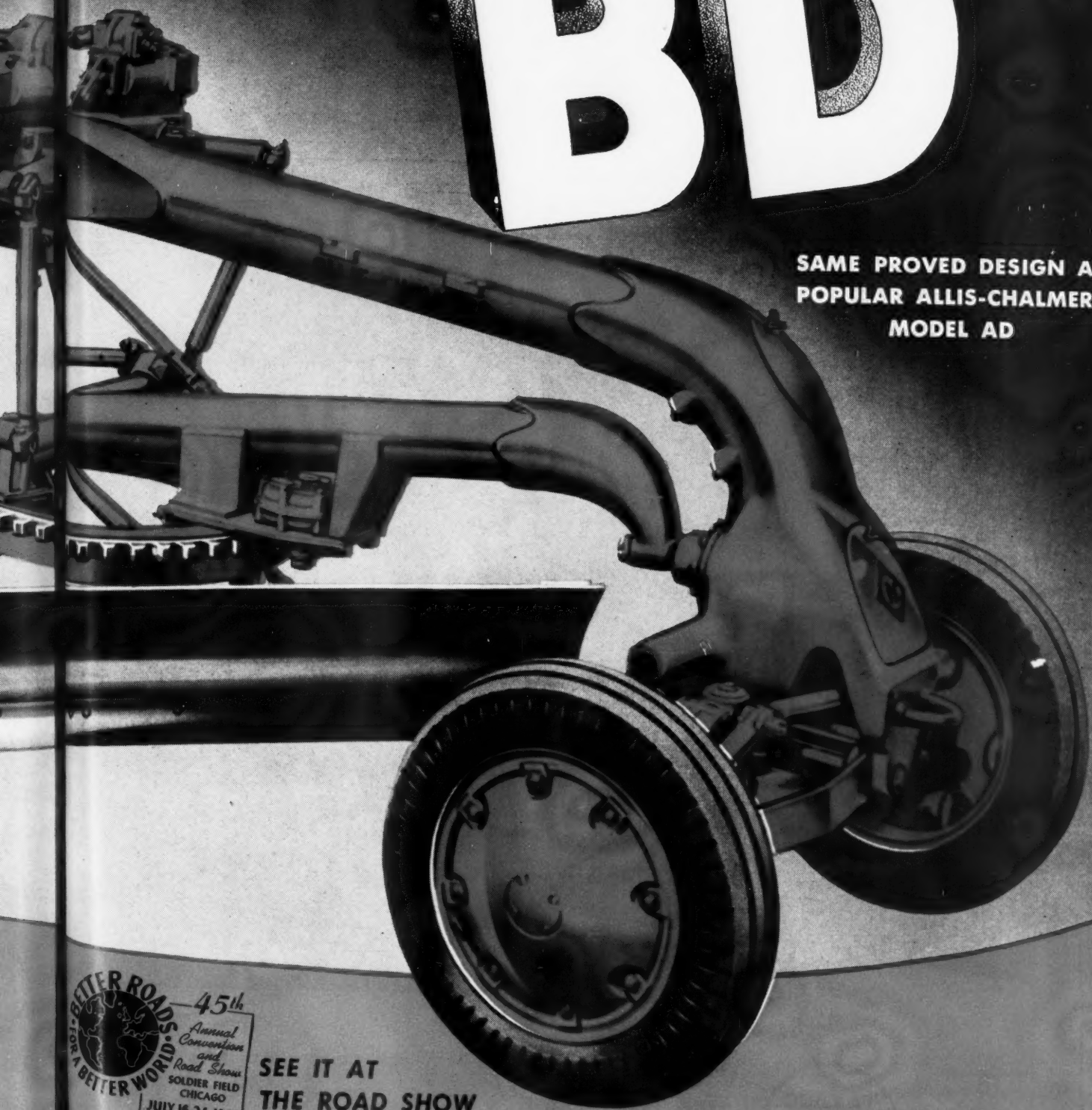
- ✓ HORSEPOWER: 50.5 brake. General Motors 2-Cycle Diesel Power.
- ✓ WEIGHT: 17,300 lbs.—balanced for maximum traction and control.
- ✓ SPEEDS: Six forward—1.30 to 14.69 m.p.h.
Three reverse—1.55 to 5.41 m.p.h.
- ✓ Exclusive Tubular Frame.
- ✓ 28-inch working throat clearance —
22-inch axle clearance.
- ✓ 12-foot "Roll-Away" Moldboard — 360°
turning radius.
- ✓ Full Blade Visibility; Simplified Maintenance; Comfortable Platform; Rigid Steering Control.

LOW OPERATING COST • SUPERIOR PERFORMANCE • DEPENDABLE SERVICE

the new **ALL-PURPOSE**

BD

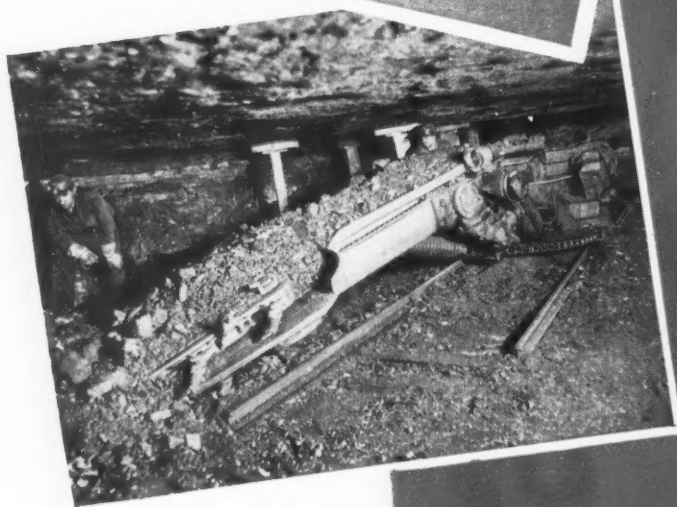
SAME PROVED DESIGN AS
POPULAR ALLIS-CHALMERS
MODEL AD



FOR A BETTER ROAD
45th
Annual Convention and
Road Show
SOLDIER FIELD
CHICAGO
JULY 16-24, 1948

SEE IT AT
THE ROAD SHOW

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.



Tonnage Goes *UP*

•
•
•

Costs Come *DOWN*

Tune in . . .
TEXACO STAR THEATER
every Wednesday night
featuring Gordon MacRae
and
Evelyn Knight . . .
ABC Network.



TEXACO LUBRICANTS

4 Savings Assured when you protect anti-friction bearings with *Texaco Regal Starfak No. 2*

TONNAGE output is speeded by the use of ball and roller bearings in many types of mine machinery. Wherever such bearings are grease-lubricated protect them with *Texaco Regal Starfak No. 2* and gain four major benefits:

1. Lower Maintenance Costs: Whatever the operating conditions, *Texaco Regal Starfak No. 2* retains its stability . . . resists oxidation and gum formation . . . protects bearings so effectively that fewer repairs and overhauls are necessary.

2. Longer Bearing Life: The experience of operators everywhere proves that fewer bearing replacements are necessary when bearings are protected by *Texaco Regal Starfak No. 2* — an important saving.

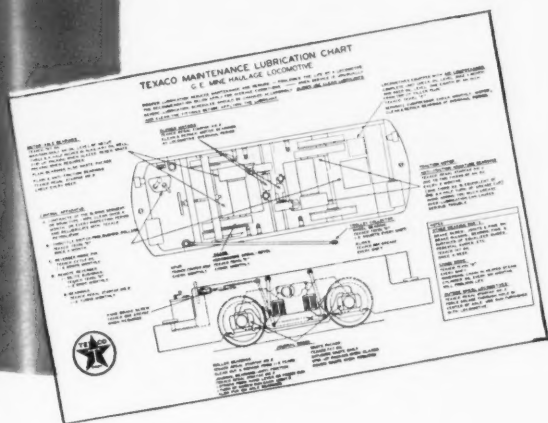
3. Lower Lubrication Costs: Each application of *Texaco Regal Starfak No. 2* lasts longer because this fine grease resists leak-

age, separation and washout. Thus, fewer applications are necessary.

4. Increased Production Per Machine: *Texaco Regal Starfak No. 2* assures the smooth, trouble-free performance that keeps your machines on the job and out of the repair shop.

In low-speed, heavy-duty bearings, the lubricant to use is *Texaco Marfak*. It gives exceptionally lasting protection and assures trouble-free performance even under the most severe conditions.

Let a Texaco Lubrication Engineer show you how the right use of the right lubricants increases bearing life and efficiency. Just call the nearest of the more than 2500 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, *National Sales Division, Dept. C*, 135 East 42nd St., New York 17, N. Y.



TEXACO MAINTENANCE LUBRICATION CHARTS:

Leading manufacturers of underground coal mining machinery approve Texaco products for use on cutters, loaders, locomotives, etc., and have cooperated in preparing these charts. Charts show clearly where and when to use the proper Texaco lubricant. Order the charts you need by make and model of each machine.

TS For the Coal Mining Industry

FOR

Bigger Output



IN ONE SECOND, Koehring Dumptor dumps full load into feeder. No unproductive waiting for slow body hoist to work — gravity dumps load fast and clean in one second.



STEEP GRADES — Ability to pull full loads up grades to 24% make Dumptors especially suitable for heavy hauling out of pits. Sturdy hydraulic brakes give complete control on steep down-hill runs. Parking brake is independent.



ROUGH HAUL ROADS don't slow up Dumptors. Ruts won't twist heavy-duty frame because steering axle oscillates as much as 21°, takes the strains out of rough mine road travel. Big tires help cushion shocks, give better traction, flotation.



in mines, pits and quarries

KOEHRING DUMPTORS

load FASTER • haul FASTER • dump FASTER

ON typical, rough, off-road hauls, you can increase trips per hour, yardage per day and reduce maintenance problems with Koehring heavy-duty, 6-yard Dumptors. Here's why:

Short Turning Radius, Big Target SAVE SPOT AND LOAD TIME

Short, 19'6" turning radius and compact design let Dumptor get close in under shovel . . . save jockeying back and forth. Big, 64 square-foot body opening provides an easy-to-hit target. Result—increased shovel production, more haul-time, less spot and load time.

Heavy-Duty 6-Yard Body BUILT FOR HEAVY ROCK SERVICE

To take severest shocks of shovel-loading, all-welded Dumptor bodies are heavily ribbed with 4" channels. Bottom of seasoned 1-5/8" oak timbers, between two 5/16" steel plates, cushions load shocks. In heavy mine and quarry service, Dumptors give you less down-time, more work-time, year in, year out with less maintenance care.

Ton of Strength per Ton of Payload SPEEDS TRAVEL ON ROUGH HAULS

Koehring Dumptors have rugged 8" ship channel main frame, heavily trussed . . . 4" chrome steel drive axles . . . cast alloy-steel "I" beam steering axle, that take the twists and strains of fast off-road travel. Big rugged

tires take road shocks. There are no leaf springs . . . Dumptor needs only one big double-coil spring, on steering axle. You have NO spring maintenance.

6 HP for Every Ton of Gross Weight GIVES GREATER GRADE-ABILITY

Dumptor has 6 HP for every ton of gross vehicle weight. That means more "GO," more acceleration, less shifting on grades. Also, plenty of power to climb grades to 24% with full load. Dumptors are built to stand up under the toughest hauling of mine and quarry service.

No Slow, Troublesome Body Hoists . . . DUMPTOR DUMPS IN ONE SECOND

At the dump, gravity dumps load . . . fast. One second and body is empty . . . you're on the way for another load. You save 15 to 25 seconds every dump. No mechanical complications . . . no body hoist maintenance. Free-swinging kick-out pan breaks suction of sticky materials . . . adds 3/16" of steel to strength of Dumptor bottom.

No-Turn Shuttle Operation SAVES SLOW TURNS EVERY TRIP

Because Koehring constant-mesh transmission makes same 3 speeds available in both directions, Dumptors are never turned on shuttle hauls. On a 1,000' haul (16 round trips per hour), this gains 8 minutes every hour. Let your Koehring distributor show you what Dumptors can do to save money in your mine, pit or quarry.



Koehring 605 Rock Shovel Keeps Pace with Fast Dumptor Hauling Speed . . .

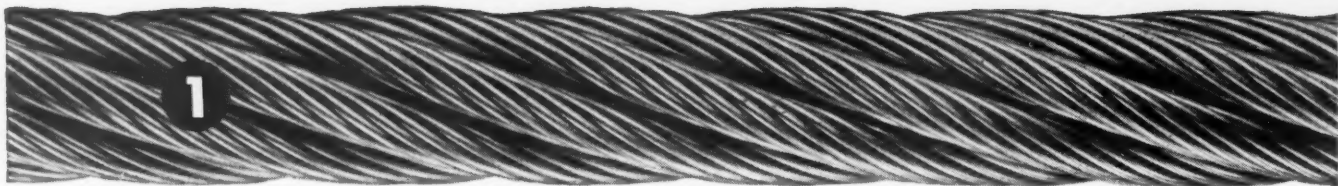
For balanced, high-production teamwork on both your excavating and hauling operations, team up your Dumptors with the Koehring heavy-duty 605 Rock Shovel. Its fast operating speeds . . . big 1½-yard dipper capacity . . . rugged, extra strong boom, with shock-absorber mount . . . and big power-operated clutches, all keep production high, costs low. Your Koehring distributor can also show you heavy-duty Koehring excavators in ½-yard and ¾-yard sizes that will satisfy your exact requirements.

KOEHRING

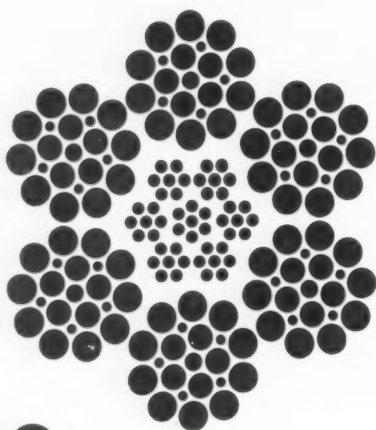
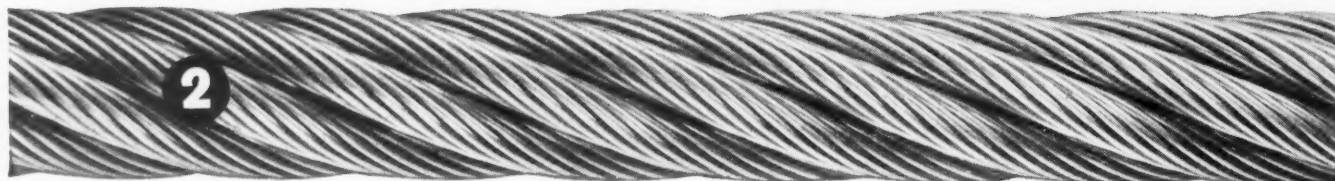
COMPANY, Milwaukee 10, Wisconsin

Subsidiaries: JOHNSON • KWIK-MIX • PARSONS

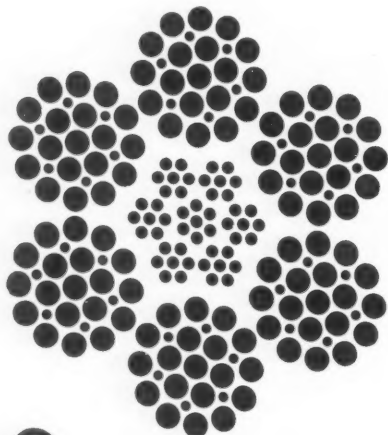
DUMPTOR—Trademark Reg. U. S. Pat. Off. K324



What's the difference...and why?



1 6x21 FILLER-WIRE TYPE U.
INDEPENDENT WIRE ROPE CORE.



2 6x25 FILLER-WIRE TYPE W.
INDEPENDENT WIRE ROPE CORE.

At first glance, these two pieces of wire rope look pretty much alike. But a study of the cross-sections reveals differences—and these differences are important when you're buying rope for dragline machines.

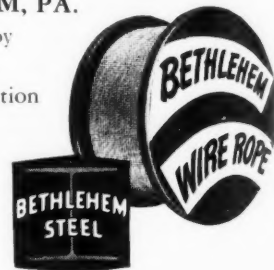
Note that the outer wires of the Type U rope are larger than those of the Type W. They will therefore stand up longer under abrasive wear. Yet they are not so large as to make the U a stiff rope—one difficult to spool. All in all, the Type U, with lang lay, is an excellent rope for draglines, which almost invariably encounter abrasive conditions.

The Type W, on the other hand, is a good choice for hoist or boom lines. It contains a greater number of wires than the U, and the crown wires are smaller. It is a more flexible rope, hence curves more easily around small sheaves. You'll find it a sound choice when both high strength and resistance to bending fatigue are essential. Lang lay is widely used in Type W hoist lines; either regular or lang in boom lines.

Bethlehem wire rope is of course available in many different types besides the two mentioned above. Each has its uses, its specific applications. You'll get better, longer service by picking the *right* types for your dragline machines, cranes, power shovels, etc. Ask a Bethlehem man to help you. He'll be glad to, with no obligation on your part.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

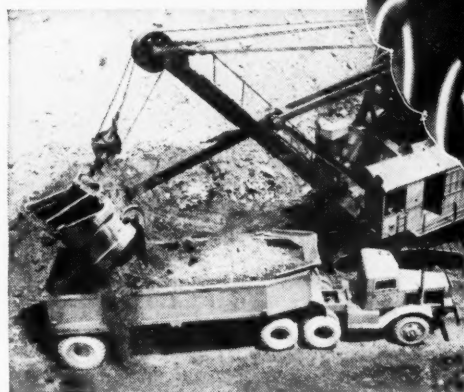
On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation



When you think WIRE ROPE...think BETHLEHEM

Two Ways

**to lower costs
in mine and
quarry hauling**



HARD ROCK LUG
for severest off-the-
road service

ROAD LUG
for service off AND
on the road

BUY and SPECIFY GOODYEAR — it pays!

ONE: The super-tough Hard Rock Lug for off-the-road service. TWO: The dual-purpose Road Lug for service both off AND on paved roads.

That's the simple answer to lowest-cost per-ton-mile in mine and quarry hauling. It's simple because it's sensible—*no one kind of work tire can best*

handle every kind of rock work. And that's why Goodyear builds these *two* special-purpose tires —each one designed and engineered to meet the needs of specific operating conditions.

Both the Hard Rock Lug and the Road Lug are built with super-strong rayon cord. Each

rolls on an extra-heavy tread specially designed for its own type of work. And each is a long-life, low-cost, job-proved performer that will do your work better and longer. Ask your Goodyear man for his recommendation as to which one best fits *your* needs.

Road Lug—T.M. The Goodyear Tire & Rubber Company

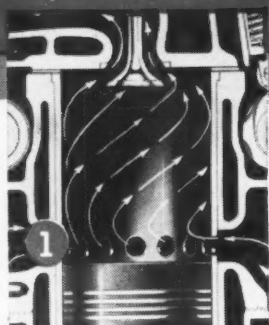


GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Better Before—

Owners of General Motors Diesel Engines have the Advantage of Continuous Advances through Steady Engineering Development

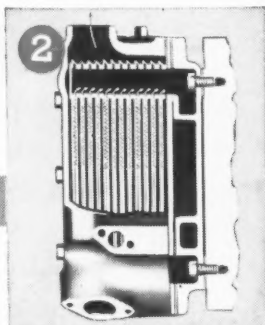


LARGE HOLE CYLINDER LINERS—5/8"-diameter air intake ports replace 5/16" ports. This offers less restriction to the flow of air, contributes to greater horsepower by improving combustion, cuts fuel consumption and widens the span of efficient operating speeds.

Consider these Improvements

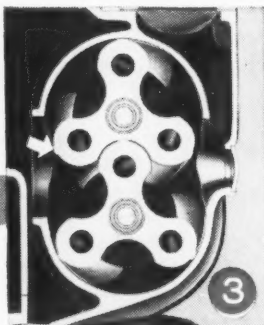
In the New GM Diesels

All of these improvements are available to present owners of GM Series 71 Diesel engines. GM engineering has made these new parts interchangeable with former ones. Thus any owner can bring his engine up to date when parts replacement is advisable by having the new parts installed by his qualified GM Diesel Distributor.



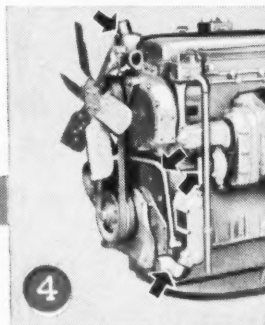
IMPROVED OIL COOLER—Cooling capacity has been increased 50%. This lowers oil operating temperatures, eliminates high-temperature sludging and means longer lube oil usage without draining.

(Not shown on engine cutaway drawing)

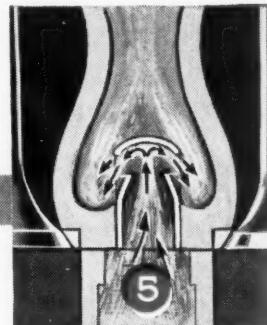


IMPROVED BLOWER EFFICIENCY—By the addition of small lands or ridges along each lobe of the blower, clearance has been reduced between the rotors and blower case. This results in better scavenging with improved combustion and clean exhaust.

(Not shown on engine cutaway drawing)



IMPROVED WATER CIRCULATION—Cooling has been improved by increasing the water flow. Water passages have been streamlined and increased in size at the thermostat housing and elbow, pump inlet elbow, water by-pass tube and oil cooler.



CYLINDER HEAD WATER NOZZLE—Cylinder head cooling becomes more efficient and uniform because the water is directed under pressure to spots requiring the greatest cooling. This results in longer valve life and reduces the possibility of cylinder head cracking.

Every Series 71 GM Diesel Engine is Given 2½ or More Hours' Running Test Before Shipment

DETROIT DIESEL ENGINE DIVISION

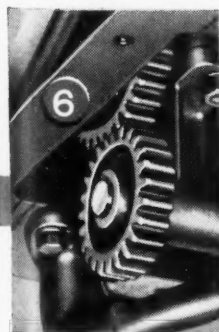
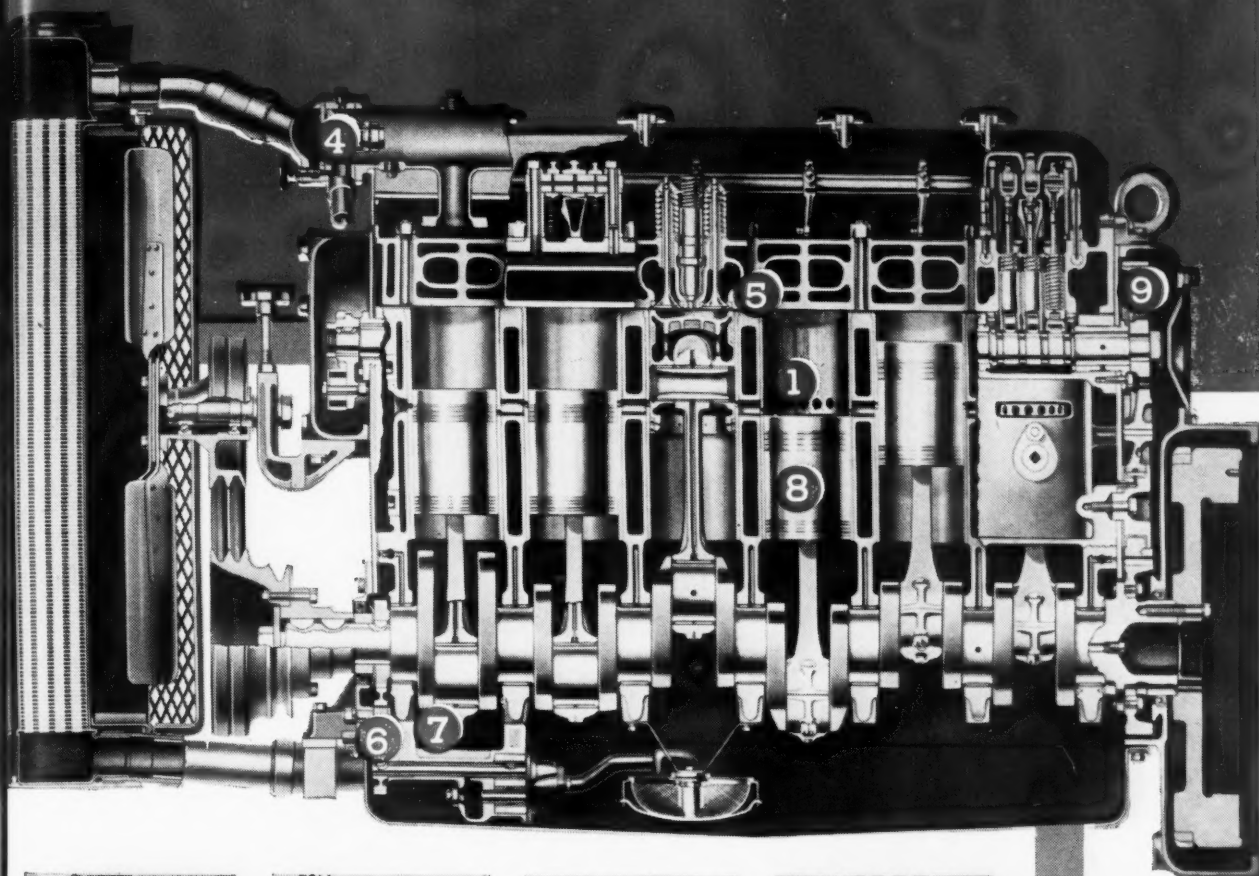
SINGLE ENGINES... Up to 200 H.P.

DETROIT 28, MICHIGAN

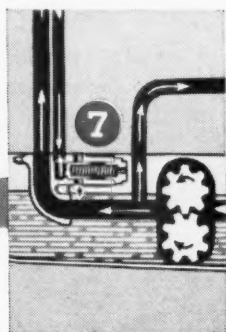
MULTIPLE UNITS... Up to 800 H.P.

GENERAL MOTORS

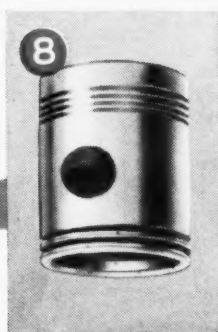
Even Better NOW



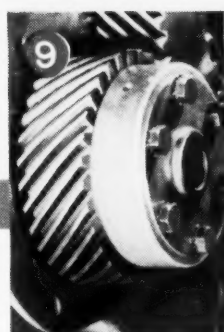
GEAR-DRIVEN OIL PUMP—Instead of being chain-driven, the oil pump is now gear-driven. The gears are of long-lasting hardened steel. This has reduced oil pump maintenance and made a more positive drive. Eliminates the possibility of oil pressure failure due to chain breakage. Increased drive ratio steps up flow of oil.



OIL REGULATOR VALVE—Assures proper oil pressure in oil gallery and throughout essential passages. Full oil pump capacity flows through the engine. Big improvement over former low-pressure by-pass valve at the lube oil pump.

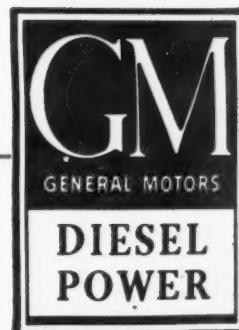


TIN-PLATED PISTONS—All post-war pistons are again electroplated externally with tin. Tin reduces friction and improves the wearing qualities of the pistons. It also retards the formation of hard carbon deposits.



ALL STEEL GEARS—Every gear in the GM Series 71 engine is now made of high-quality steel for long life and uninterrupted service.

Diesel Brawn without the Bulk

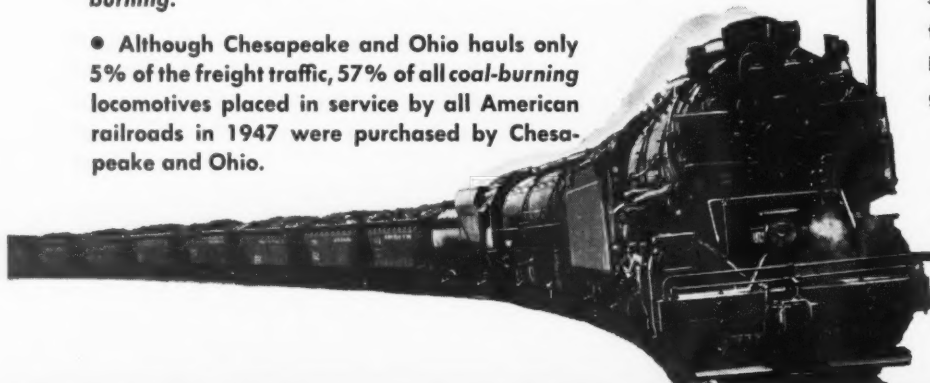




No. 2...

LOCOMOTIVES

- Chesapeake and Ohio has 1,181 coal-burning locomotives in service as of July 1, 1948.
- Chesapeake and Ohio expects delivery of 45 new coal-burning locomotives during the last half of this year.
- All locomotives on the Chesapeake and Ohio District are coal-burning.
- Although Chesapeake and Ohio hauls only 5% of the freight traffic, 57% of all coal-burning locomotives placed in service by all American railroads in 1947 were purchased by Chesapeake and Ohio.



You know the facts about the growth of the coal industry during the past several years. Chesapeake and Ohio Railway is keeping pace. The locomotives that keep the 65,000 C & O coal cars "on the move", are featured in the second of this series presenting important facts about the greater coal-handling facilities of the greater Chesapeake and Ohio.



CHESAPEAKE & OHIO RAILWAY

Largest Originating Carrier of Bituminous Coal in the World



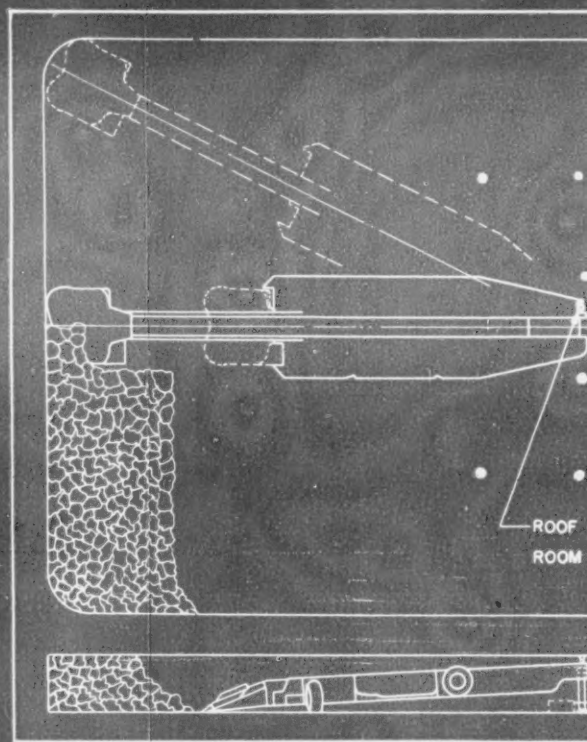
Reg. U. S. Pat. Off.

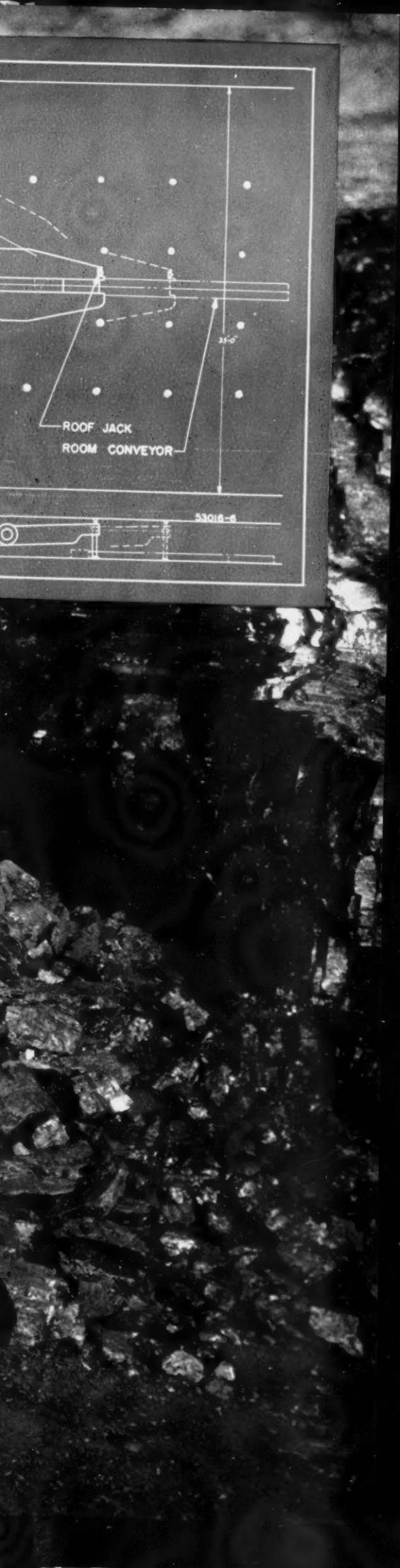
You saw it at the Show . . here's the Jeffrey 61-CLR Conveyor-Loader in actual operation. Developed for use in mines with chain conveyors. Completely hydraulic . . 24 inches overall height . . easy maneuverability (machine travels in an arc across room). Drawing shows it fully extended and swung from a hinged hydraulic roof jack, which forms the pivoting point.



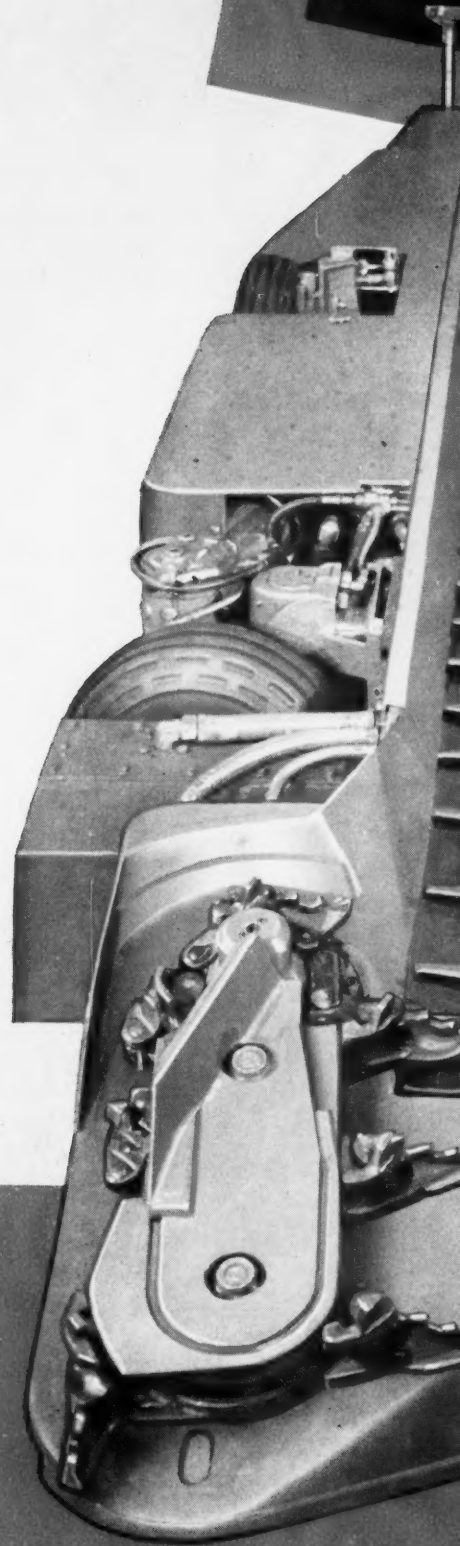
Showing discharge end of Conveyor-Loader set-up to load into a Jeffrey Underground chain-type Conveyor

R Conveyor-Loader in actual operation.
completely hydraulic . . 24 inches overall
(an arc across room). Drawing shows it
roof jack, which forms the pivoting point.



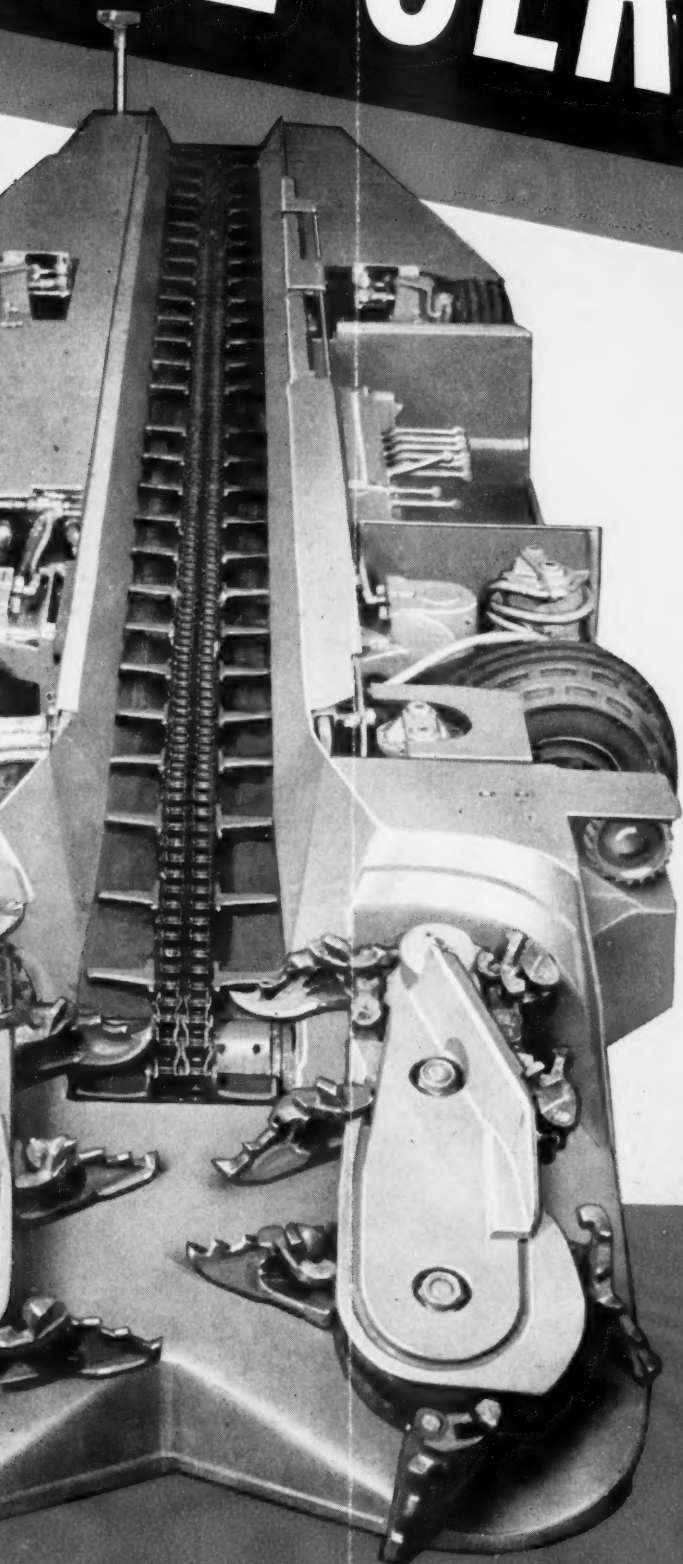


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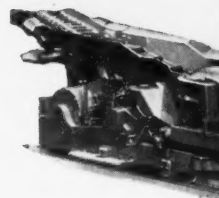


NEW CONVEYOR-LOADER
principle permitting a fixed
ing out coal after each cycle
production cost in conveyor

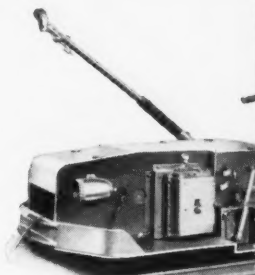
61-CLR



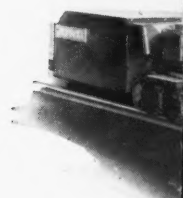
OR-LOADER — with an entirely new
 ing a fixed discharge point while load-
 each cut. Increases efficiency — lowers
 conveyORIZED mines. (Patent Pending)



LOADING MACH



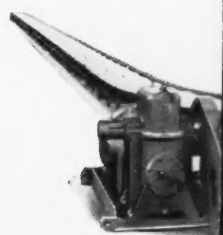
DRILLS AND
 DRILLING MACH



UNIVERSAL
 COAL CUTTER



SHORTWALL COA



THE J

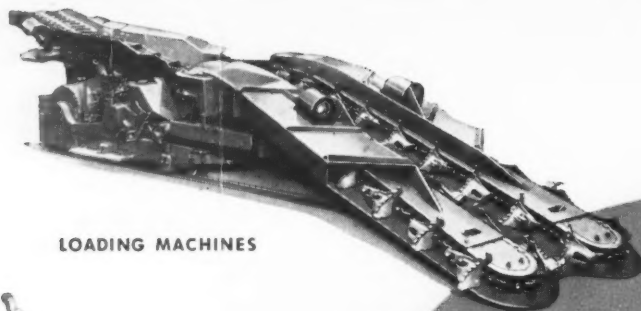
912

Sales Offices:

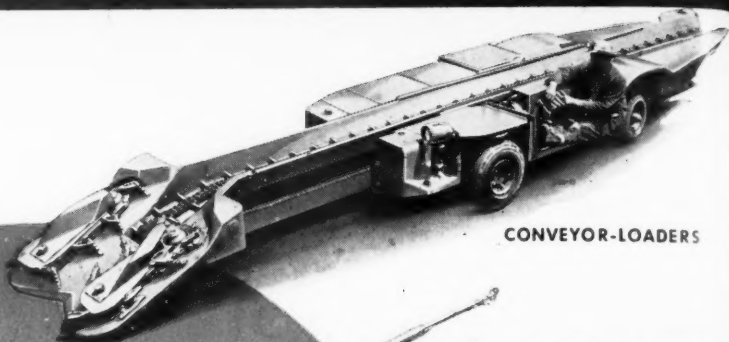
Service Stations:

Foreign Plants:

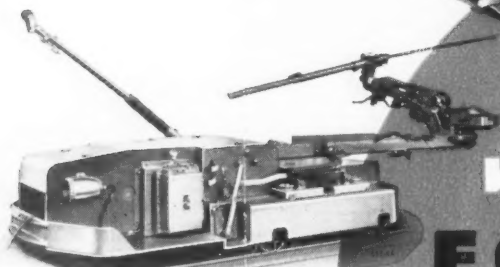
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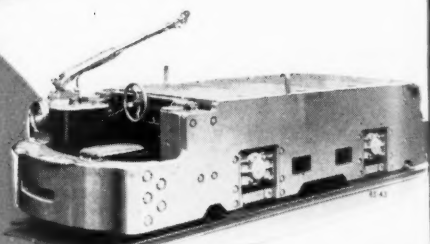
LOADING MACHINES



CONVEYOR-LOADERS

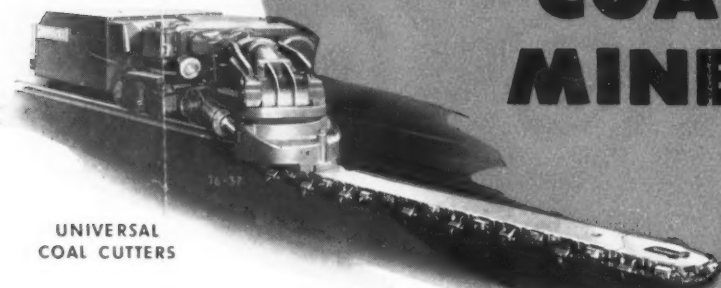


DRILLS AND
DRILLING MACHINES

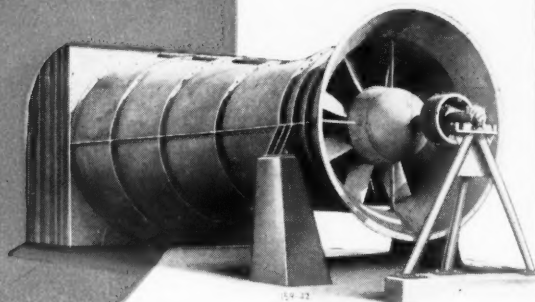


TROLLEY AND STORAGE
BATTERY LOCOMOTIVES

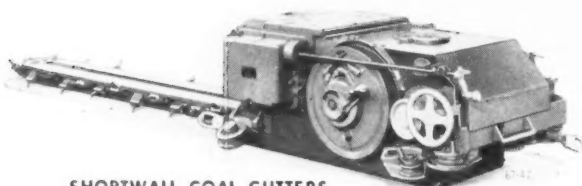
JEFFREY EQUIPMENT FOR COAL MINES



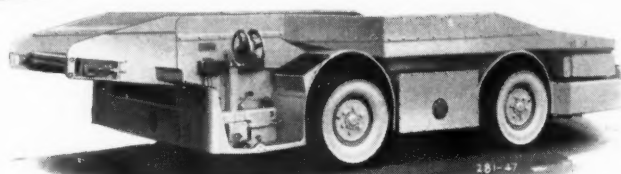
UNIVERSAL
COAL CUTTERS



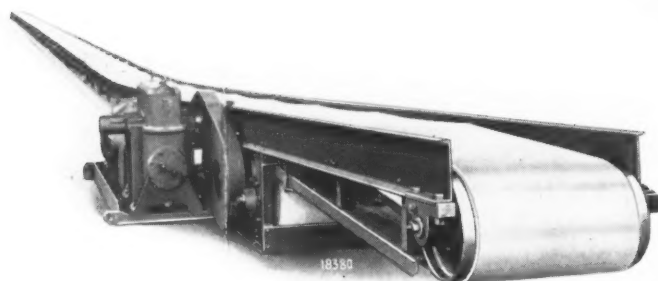
FANS AND BLOWERS



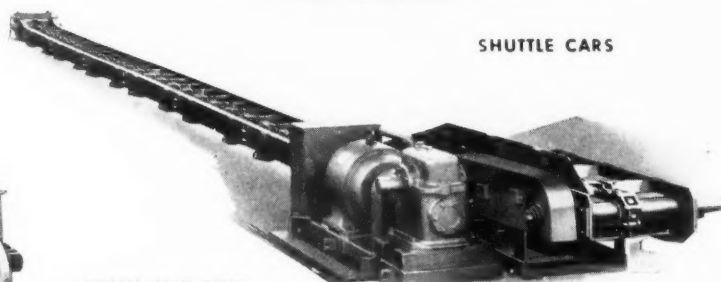
SHORTWALL COAL CUTTERS



SHUTTLE CARS



CHAIN AND BELT
TYPE CONVEYORS



AND GENUINE RENEWAL PARTS

THE JEFFREY MANUFACTURING COMPANY

Established in 1877

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

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Harlan, Ky.

Birmingham
Mt. Vernon, Ill.

Logan-Beckley
W. Va.

Scranton

Foreign Plants:

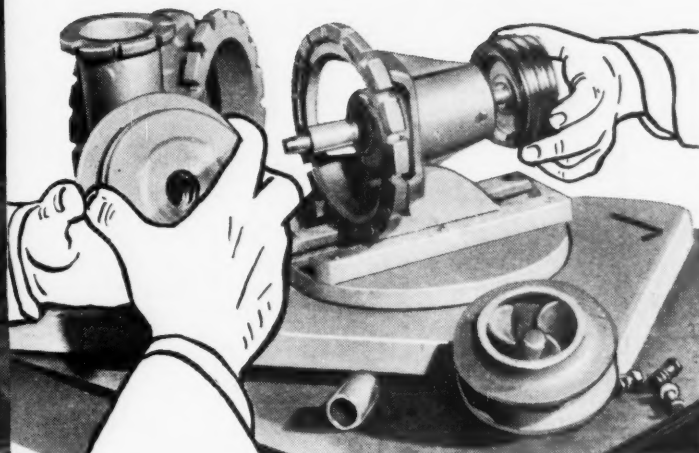
Jeffrey Mfg. Co., Ltd.
Montreal, Quebec

British Jeffrey-Diamond Ltd.
Wakfield, England

Jeffrey-Galion (Pty), Ltd.
Johannesburg, S. A.

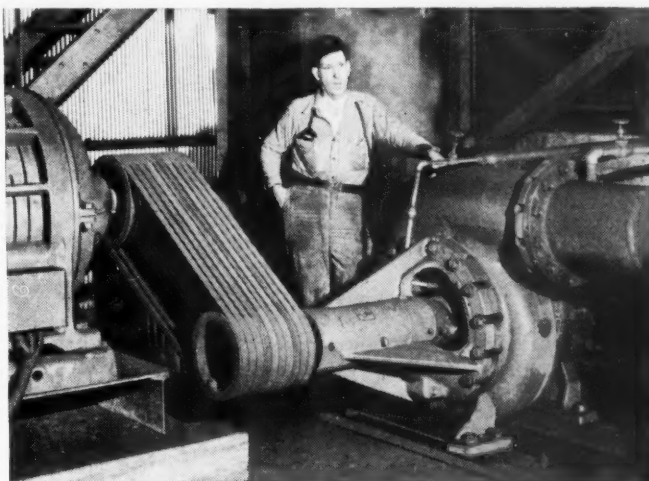
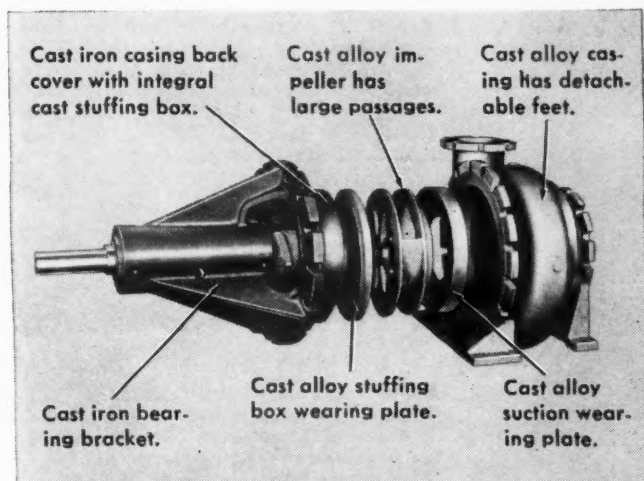
ely new
ile load-
- lowers
Pending)

See the Proof! Take this Model Solids Pump Apart Yourself!



1. See for yourself how easily . . . how quickly . . . you can disassemble this model Allis-Chalmers solids pump! For one thing, it has *only five* working parts—all easily accessible. And notice how pump design permits removing these parts *without disturbing the piping!*

2. Another thing—these pump parts are all standardized. This has meant substantial inventory savings for many CW pump owners. To change capacity you need only change the pump speed . . . no need to touch the impeller at all. Easy adjustment . . . easy maintenance.



3. Yes, you can actually *see* high efficiency design in every detail of this solids pump. Oversize shaft . . . casing and working parts made of Allisite, a special alloy for high abrasion resistance—these add up to a pump that will deliver *rated* capacity month after month!

4. You see, Allis-Chalmers designed this pump especially for coal. It's more than a sludge pump, it's a *coal washing pump!* Handles up to 40% solids in suspension successfully. Fits into cramped quarters. Variable discharge nozzle arrangement fits any installation set-up.

GET THE FACTS! The A-C representative in your locality will gladly arrange a desktop demonstration of model solids pump in your office. No obligation whatever. Clip the coupon NOW and mail direct to ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2442

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products



WRITE FOR FREE DEMONSTRATION

Allis-Chalmers Mfg. Co., Milwaukee 1, Wisconsin

- ☐ Yes, I would like to see this model solids pump in my office.
- ☐ Please send me Solids-Handling Pump Bulletin 08B6381B.

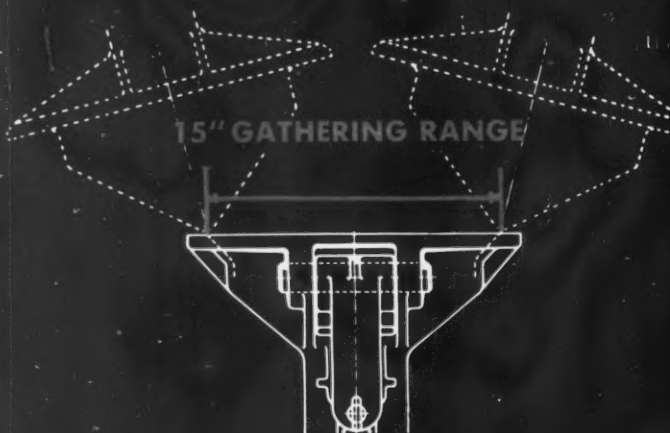
NAME.....

ADDRESS.....

FIRM.....

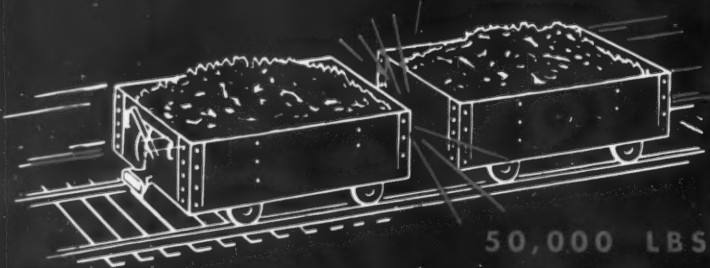
1234

BUILT FOR



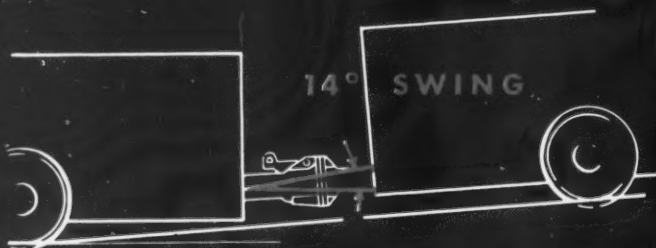
... ON CURVES

Male-and-female type coupler heads provide the O-B Automatic Coupler with 50 percent more gathering range than is found in ordinary couplers. Depending upon the car construction and its relation to the track, O-B Couplers will enable cars to operate over and automatically couple upon curves of minimum radius.



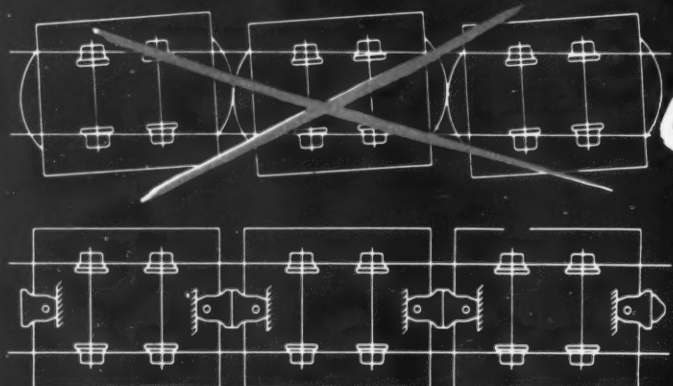
... UNDER HEAVY IMPACT

Tough, springy rubber buffing pads replace breakable steel springs in O-B's modern draft gear assembly. Completely enclosed, the rubber draft gear will absorb impact blows up to 50,000 pounds—as much as 100,000 pounds with the Form-8 design.



... OVER DIPS AND KNUCKLES

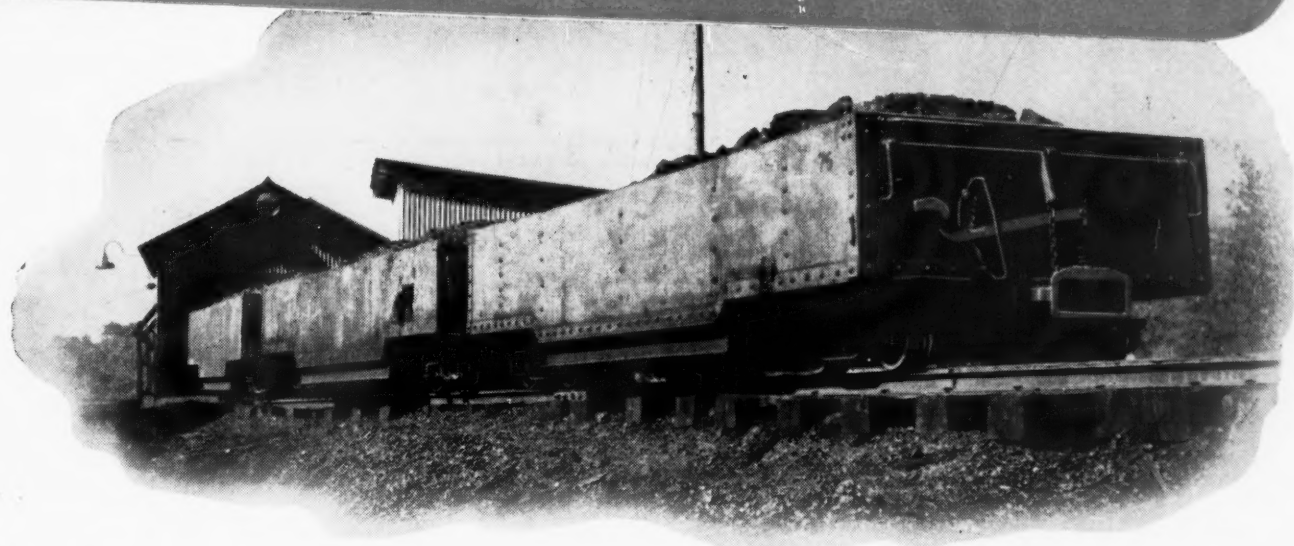
A vertical swing of 14° enables O-B Couplers to operate over sharp breaks in grade. All movement takes place in the flexible rubber draft gear—the coupler faces remain locked to each other in center-to-center position. In addition, five inches of vertical gathering range permit the couplers to join on a wide range of dips and knuckles.



... ON THE TRACK

Preventing zigzagging under push or buff, O-B Form-8 Couplers actually help to keep your cars on the track. An improved draft gear construction holds the cars tightly in center-to-center position counteracting the car's normal tendency to ride the rail under push or buff.

MINE WORK



Take a good look at the O-B Automatic Coupler in the picture above. It appears to be different from railroad-type couplers. It *is* different—and for good reasons, too! Railroad-type couplers were developed for railroads with their long stretches of straight track and gradual curves and grades. Mining service imposes an entirely different set of conditions. It requires a coupler which is designed specifically to meet those conditions.

Because mine curves have shorter radii and coupling on curves is frequent, O-B Couplers are provided

with extra-wide gathering range. They permit cars to operate over sharp breaks in grade at dips and knuckles. Their sturdy rubber draft gear will absorb severe impact blows without damage. The O-B Form-8 Coupler exerts a stabilizing pressure to counteract a mine car's normal tendency to derail under push or buff.

If you are considering the purchase of new mine cars, you will find it profitable to investigate the O-B Automatic Coupler—the coupler that was designed specifically to meet mine operating conditions. A postcard request will bring full information.

Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd.,
Niagara Falls, Ontario



Why midwest mine shifts loaders to

new

Superla Mine Lubricant No. 4

Tested in one hard-working Joy loader, Superla Mine Lubricant No. 4 sold itself into 7 more of these grease-lubricated loaders in a large midwest mine.

Introduced as one of a new and improved line of cutter and loader lubricants, Superla Mine Lubricant No. 4 showed its superior qualities in these four ways:

- 1** **Low repair costs.** During a 6-month test period with Superla Mine Lubricant No. 4, no clutch plates were replaced. No machine shutdowns or breakdowns occurred due to faulty lubrication.
- 2** **Good Lubrication.** With Superla Mine Lubricant No. 4 it was immediately apparent that no warm-up period was needed when starting loaders. The lubricant was light enough to permit easy starting, yet did not thin out excessively at operating temperatures.
- 3** **Ease of application.** Servicing presented no problem with Superla Mine Lubricant No. 4, which poured readily from the bung-type barrels and was dispensed easily from hand-operated grease guns.
- 4** **Low consumption.** During the test run with Superla, 10 to 15% less lubricant was used than previously had been required.

You can get these results of improved lubrication in your cutters and loaders with the new Superla Mine Lubricants. Grades are available for both grease- and oil-lubricated types of cutters and loaders. Each grade has been tested and proved in severest mine operation. The Stand-

ard Oil Lubrication Engineer in your locality will be glad to help you test these improved products in your machines. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.



STANDARD OIL COMPANY (INDIANA)



Six Grades for lubricating any type of Cutter or Loader

No. 00. An oxidation-inhibited oil containing a detergent additive. It provides exceptionally clean operation and low oil consumption for oil-lubricated gear cases. Also suitable for loaders with dual systems.

No. 0. A high-quality additive-type oil similar to No. 00 except that it is a slightly heavier grade. It is designed for loaders with a single oil system.

No. 2. A soft, semi-fluid grease for lubricating gathering-head gear cases where greater fluidity is desired than that usually provided by most loader greases.

No. 4. A semi-smooth grease particularly resistant to thinning out under heat and mechanical working. At the same time it can easily be poured from the barrel bung at ordinary mine temperatures. It is especially designed for Joy loaders.

New Superla Mine Lubricants

No. 6. A grease of heavy consistency and good high-temperature characteristics. Its fibrous structure makes it particularly adaptable to gathering-head and general underground lubrication.

No. 8. A smooth grease having superior high-temperature characteristics. It is suitable for armature bearings and pressure-gun work where a grease of heavy consistency is desired.

STANDARD OIL COMPANY (INDIANA)



Are you short on *check the BIG*

A 300 h.p. "B" Tornadoizer push-loads the "B" Tournapull as it strips topsoil and clay. The BIG "B" Tournapulls are also economical benching banks to cut costs of shovel overcasting.



THE BIG "B" Tournapull is the equivalent of a 30-yard dragline bucket on rubber tires . . . self powered . . . fast . . . with unlimited range.

Pusher loaded, a fleet of three or more "B" Tournapulls can handle complete removal of overburden, top bench stripping, opening of box cuts, etc. Once loaded, each unit operates independently, hauling and unloading anywhere under its own power.

The ability of the Tournapull to strip along natural ground contours simplifies drilling and blasting problems. The BIG "B" is versatile . . . overburden can be readily hauled outside area of future operations or used to fill mined-out areas . . . top soil is easily segregated, easily replaced to make mined area saleable . . . landscaping, where necessary, is greatly simplified.

The BIG "B" is an "all-weather" tool. Its ability to work in mud, on grades or other adverse conditions that would stall an ordinary scraper . . . its high speed . . . giant rubber tires . . . big bowl capacity . . . pushbutton con-

trol, and revolutionary new Tournamatic differential materially increase any previous scraper production capacity . . . add extra profits to your season's operation.

Your Tournapull fleet and Tornadoizer pusher can be moved anytime under their own power to another pit with no delay for dismantling, loading, or erecting. They need no power connection. A fleet of three Tournapulls with pusher cost less than one-third the price of a big stripping shovel or dragline.

Available this Season!

You can get these big yardage Tournapull strippers right now . . . put them to work immediately without any loss of erection or installation time. LeTourneau field engineers will gladly assist you in analyzing your stripping problems and in estimating your cost-per-yard operation with the new high-speed, big capacity Tournapull equipment. See your LeTourneau Distributor now, or write, wire, or phone us Today.



**See your LeTourneau Distributor
NOW for complete information**

strip equipment? **NEW "B" TOURNAPULL**

*Check these advantages . . .
Figure what the Tournapull
stripping method can do for you*

✓ 35 tons per load with the 240 h.p. "B" Tournapull—Safe operation with multiple-disc air brakes for complete control.

✓ Hauls anywhere up to 16 m.p.h. . . . big 24.00 x 29 tires permit travel to scattered areas . . . eliminate limited shovel or dragline disposal.

✓ Load, haul, spread, with one tool, reduce equipment investment, maintenance.

✓ Extra work hours . . . low pressure, tapered bead tires give increased flotation, . . . new-type differential eliminates wheel slippage . . . mean you can start earlier, work longer in adverse job conditions.



The "B" Tournapull hauls heaping loads to the spoil pile. Four speeds forward plus instantaneous shifting keep the big rig rolling up grades or over soft spoil banks—give faster hauling cycles round the clock . . . in any weather.



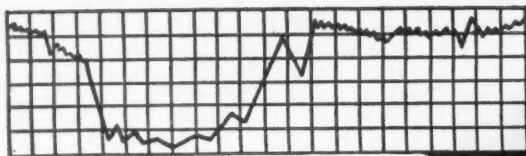
The BIG "B" Tournapull puts the spoil where you want it. Fingertip electric control of scraper apron and tailgate assure positive ejection of all types of material . . . fast, controlled spreading at the touch of a dashboard switch.

LETOURNEAU
PEORIA, ILLINOIS



TOURNAPULLS

MORE YARDS PER HOUR WITH RUBBER-TIRED POWER



OFF-PEAK POWER

keeps them
CHARGED



SIX OR SEVEN hours of charging per day during the off-peak period . . . that's normally time enough for full recharge of the batteries that operate your mine haulage equipment—*provided they are EDISON Nickel-Iron-Alkaline Batteries.* The reason: EDISON Batteries can be charged day after day at an average of their normal rate without injury.

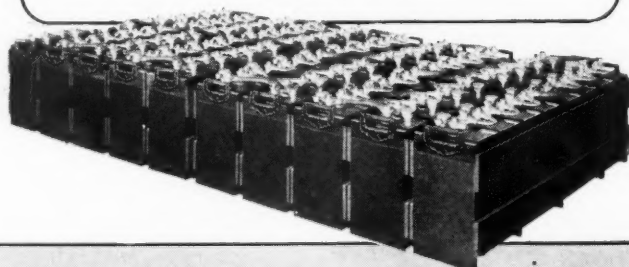
In addition, they require no critical adjustment of the charge rates. That means that you can charge them directly from the d-c power lines through suitable resistors.

EDISON Nickel-Iron-Alkaline Batteries have many other built-in advantages: their rugged steel construction inside and out withstands rough usage; their electrolyte, an alkaline solution, is a natural preservative of steel; their electrochemical principle of operation is free from self-destructive reactions. That's why they stay on the job, out of the repair shop. That's why they cut annual operating cost and give longer service life than any other type of battery.

Specify EDISON and you specify maximum reliability—enduring quality.

*In Mine Locomotives and Shuttle Cars EDISON
Nickel-Iron-Alkaline Batteries Give You
These Important Advantages*

- ★ They are **durable mechanically**; grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- ★ They are **foolproof electrically**; are not injured by short-circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.
- ★ They can be **charged rapidly**; do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.
- ★ They **withstand temperature extremes**; are free from freezing hazard; are easily ventilated for rapid cooling.
- ★ They can **stand idle indefinitely** without injury, without attention, and without expense.
- ★ They are **simple and easy to maintain**.



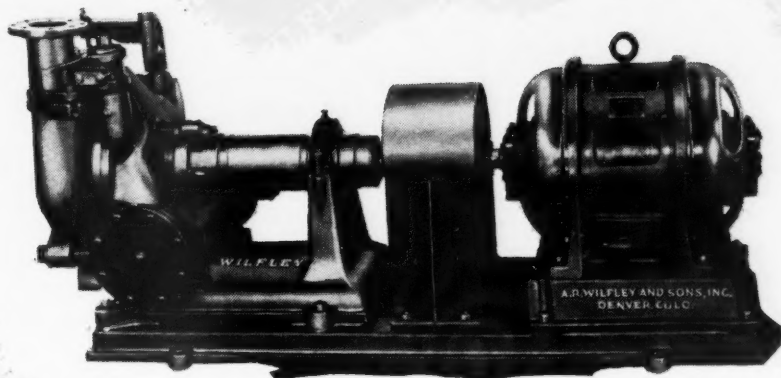
EDISON
Nickel • Iron • Alkaline
STORAGE BATTERIES

EDISON
STORAGE BATTERY DIVISION
of Thomas A. Edison, Incorporated
West Orange, N. J.

IN CANADA: International Equipment Co., Ltd., Montreal and Toronto

COST-SAVING...

PERFORMANCE



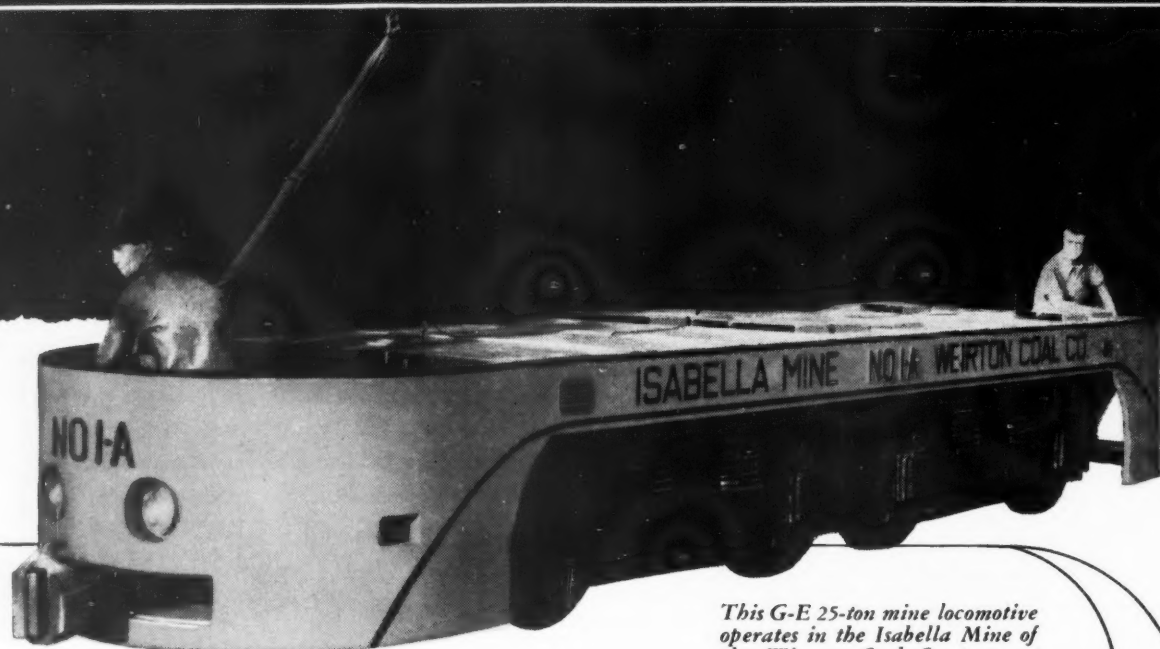
PRECISE engineering that keeps pace with continually changing industrial demands is a characteristic of the famous WILFLEY sand pump. Exclusive features of design and construction, continuously developed through pioneering and research, have kept this pump at the top of the list when cost-saving efficiency is the prime consideration. There is a size for every purpose. Heavy pumping parts of rubber, alloy iron, alloy steel—whatever material works best on your job. Individual engineering on every application. Buy WILFLEY when you want dependable performance that holds production costs down. Write or wire for complete details.

- 1 True High Efficiency
- 2 Individual engineering on every application
- 3 Continuous, trouble-free performance twenty-four hour-a-day production

WILFLEY
centrifugal PUMPS

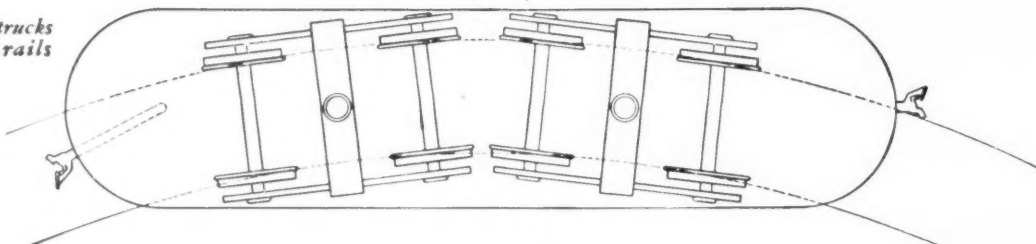
A. R. WILFLEY & SONS, Inc., Denver, Colorado, U.S.A., New York Office: 1775 Broadway, New York City

...MAKES MORE

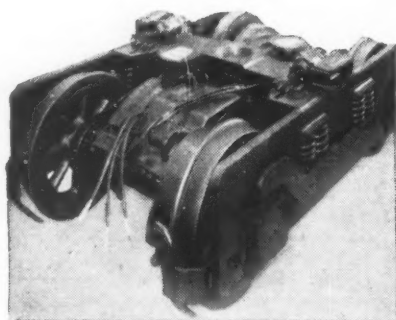


This G-E 25-ton mine locomotive operates in the Isabella Mine of the Weirton Coal Company at Isabella, Pennsylvania.

Swivel trucks follow rails freely.



EVEN AT HIGH SPEEDS—*it rides smoothly and safely***because double-swivel trucks give you these important advantages:**



Low weight per axle—reduces load on rails—decreases lateral forces on track.

Short rigid wheel base—and swivel connection to frame permits wheels to follow rails freely—reduces track maintenance and flange wear.

Short overhang at ends—AND snubber springs reduce oscillation and promote smooth riding.

TRIPS PER SHIFT

...sets new production records!

New, high-speed G-E mine haulage locomotive pulls 800-ton load at 11.5 mph—gives you lower hauling costs per ton!

With length of haulage runs from gathering point to tippie on the increase, the operators need a faster and more powerful haulage locomotive. The new smooth-running General Electric 25-ton haulage locomotive is the answer to this need. Here is why:

HIGH OPERATING SPEEDS—Powered by four 120-hp motors, this new locomotive can pull a load grossing 800 tons at 11.5 mph with anti-friction mine-car bearings under average conditions. It has a top speed of 40 mph.

SMOOTH-RIDING QUALITIES—Smooth-riding qualities of this new unit are obtained by using double-swivel trucks as used

for years on surface railroads. Better distribution of load reduces strain and wear on the rails.

LESS MAINTENANCE—Design and mounting of the traction motors promotes continuous trouble-free service. Heat dissipation is expedited by motor-driven blowers. An all-welded frame provides a permanently rigid structure without joints.

In the mine where it is now operating, this new locomotive gets the coal out in less time. Fewer locomotives, cars, and crews are required and traffic congestion is eliminated. This means a lower cost per ton of coal mined.

Bulletin GEA-4774 gives more details, dimensions, etc., on this new locomotive. Mail the coupon for your copy. No obligation of course. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

 **MINE
LOCOMOTIVES**

GENERAL ELECTRIC COMPANY
Apparatus Department, Section E657-61
Schenectady 5, N. Y.

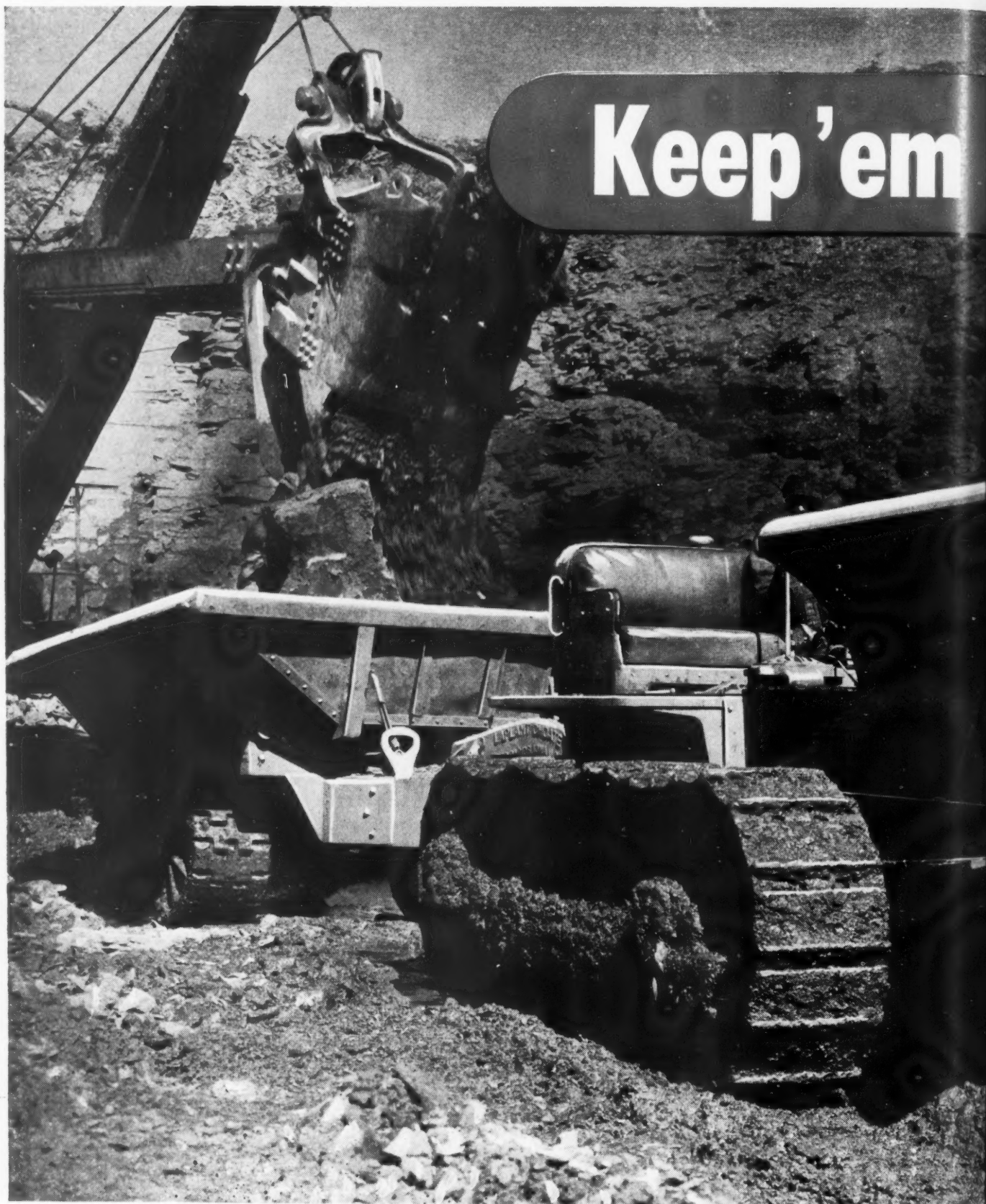
Please send me Bulletin GEA-4774.

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City..... State.....



Keep 'em

TENOL keeps Diesels on

in Service with TENOL

..the Heavy Duty Oil for Heavy Duty Engines

Sinclair TENOL is a heavy duty oil made specially for diesel engine service. It has high oxidation stability—the formation of acidic compounds and resultant gum and varnish is largely eliminated.

Furthermore, TENOL'S detergent and dispersion properties hold possible contamination by carbon and sludge in suspension until drained off in the oil. Selected additive agents protect sensitive alloy bearings against corrosion, and restrict foaming.

Because a clean engine means free rings and pistons and no excessive sludge accumulation, the time between tear-downs is increased—cost per operating hour decreased.

To keep your diesels in steady service, use TENOL for sure, safe engine lubrication.

SINCLAIR

HEAVY DUTY LUBRICANTS

YOUR NEAREST SINCLAIR AGENT WILL GLADLY ARRANGE
FOR LUBRICATION COUNSEL, OR YOU MAY WRITE TO
SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.



n the Job!



Quaker Pre-Testing

OFFERS THE
COAL INDUSTRY



BELTING FOR MAXIMUM HORSEPOWER TRANSMISSION

Whether it is a heavy duty conveyor hauling coal "out" or a V-Belt for a fractional-horsepower motor in the tippie, Quaker has the belt to fit the need . . . to step up the efficiency of the horsepower transmitted.



HOSE THAT STANDS WEAR AND ABRASION

All types of hose for water, air or steam . . . underground or above ground. Every length of Quaker hose is scientifically pre-tested to withstand the proper pressures and wear encountered in actual working conditions.



PACKINGS FOR TIGHTER SEALS . . . LONGER WEAR

Quaker offers all types of packings for pumps, flanges and valves. All are pre-tested and pre-engineered to fit the type of service they will encounter. Whether they are in the presence of water, oil, corrosive liquids or high temperatures, Quaker packings are made to stand up.

STRETCH TEST STRENGTHENS SERVICE LIFE

Quaker Pre-Tested Products Assure Positive Performance

Pulling . . . stretching . . . breaking the fabric that goes into Quaker products is just one of the more than eighteen tests to produce top quality in every one of the 9001 carrying the Quaker trade-mark.

The tensile test shown above is to assure fabric for belts that will meet and beat the recommended horsepower transmission . . . hose that will withstand all pressures encountered under working conditions.

When you specify Quaker products, you are sure of peak performance—pre-tested in the laboratory and performance proved throughout industry. For higher plant efficiency and lower operating costs, call your nearest Quaker distributor. He and the Quaker sales engineer are teamed to provide accurate recommendations on belting, hose and packings.

QUAKER RUBBER CORPORATION
PHILADELPHIA 24, PA. • New York 7 • Cleveland 15 • Chicago 16 • Houston 1
Western Territory

QUAKER PACIFIC RUBBER CO. • San Francisco 5 • Los Angeles 21 • Seattle 4



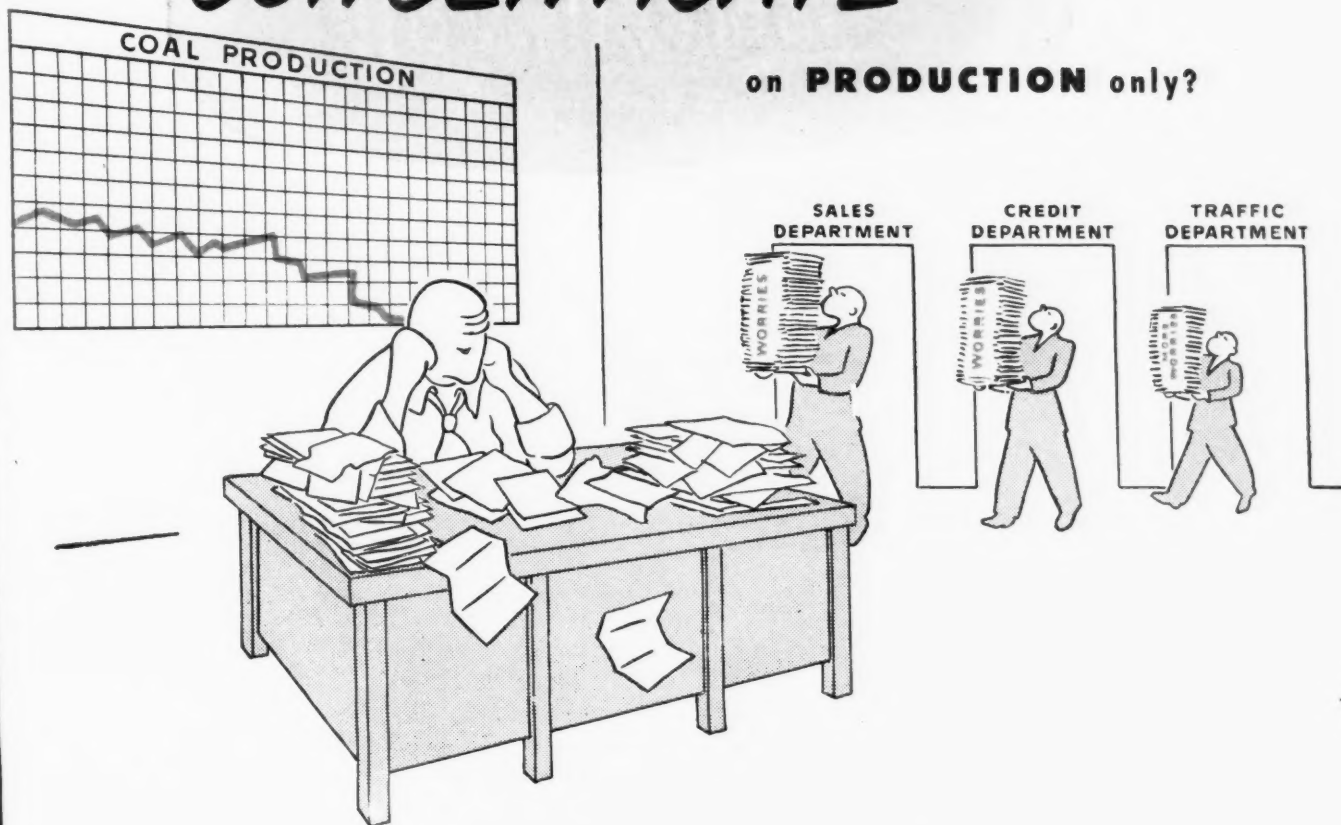
QUAKER RUBBER PRODUCTS

custom made for every industrial use

Ever wish you could

CONCENTRATE

on **PRODUCTION** only?



Why Not?

We are doing the job for many other coal operators and as a result, they are increasing production and enjoying higher profits. Here is a list of services we perform while you concentrate on production:

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|--------------------------------|-----------------------------------|
| INTENSIVE SALES COVERAGE | MARKET ANALYSES |
| PROPER SALES PLANNING | TRAFFIC PLANNING |
| INSPECTION SERVICE | ADVERTISING AND PUBLICITY |
| COMBUSTION ENGINEERING SERVICE | CREDIT, SALES ACCOUNTING SERVICES |

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& Swanson**

COAL MERCHANDISERS
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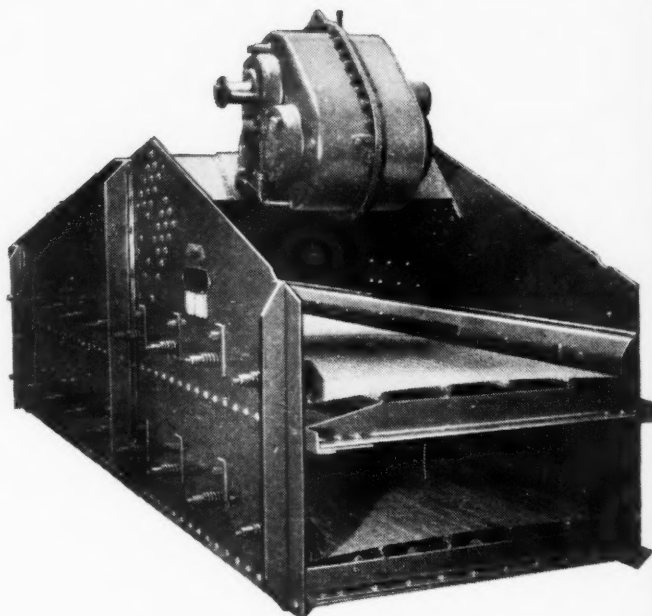
Which Yardstick Measures Screen Value Best?



CONSTRUCTION

Look at construction first — it has a lot to do with low maintenance and long screen life! Allis-Chalmers builds *Low-Head* vibrating screens of long-lasting high tensile strength steel alloys. All welded parts are "stress-relieved," eliminating local stresses caused by welding. Vibrating mechanism is independently and conveniently located on top of screen — out of the way. Its gears and bearings operate in oil-and-dust-tight steel housing.

Another important feature of the *Low-Head* screen is the cloth support frame designed to tension screen cloth properly. An increased number of supports and correct crown for different surfaces results in longer screen cloth life!

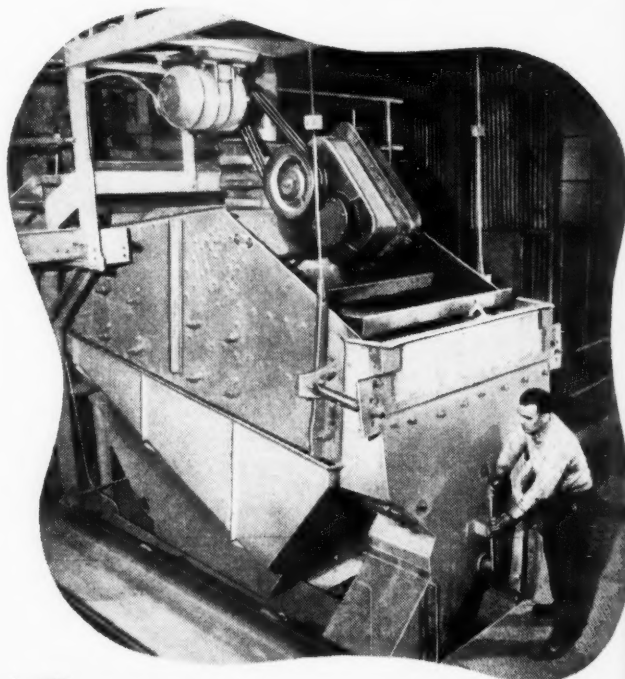


PERFORMANCE

How it works is an equally important measure of screen value. The compact *Low-Head* vibrating screen operates horizontally — saves valuable headroom and space. It can be used for either wet or dry screening... for dewatering... or as medium drain and wash screens in heavy density separations.

Straight-line motion at 45° to the horizontal results in rapid stratification of feed and a definite conveying action of the material. *Low-Head* screen sizes are from 26 in. x 8 ft to 6 x 16 ft; one, two or three decks. Write for Bulletin 07B6330A. ALLIS-CHALMERS, MILWAUKEE 1, WIS. *Low-Head* is an Allis-Chalmers trademark.

A 2473



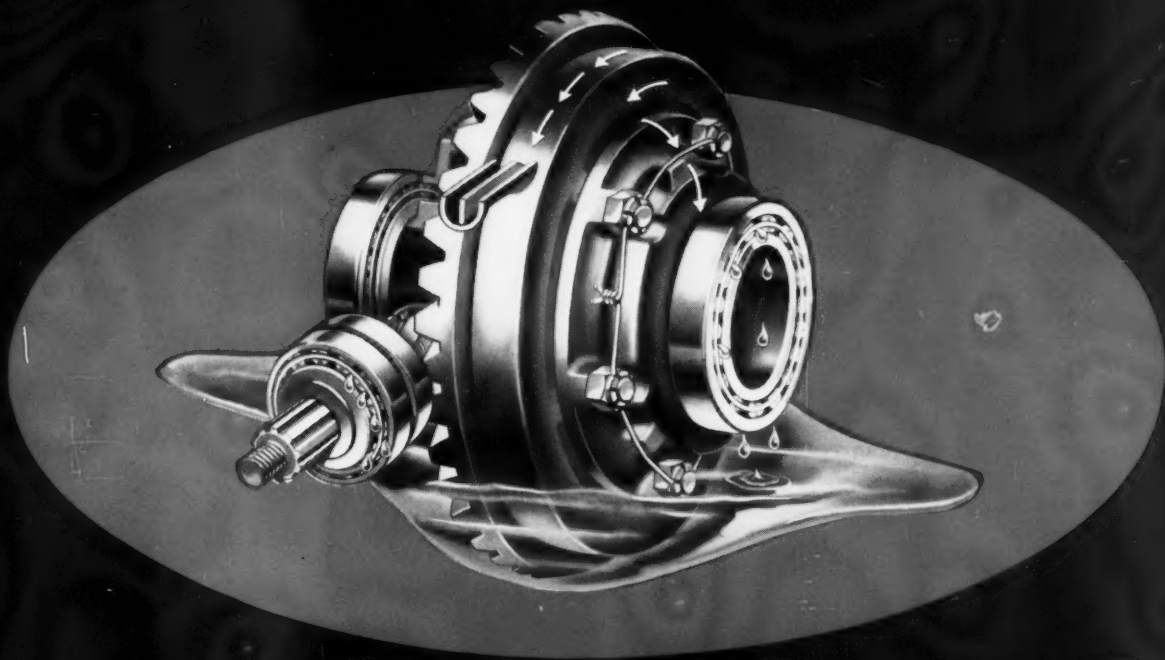
Combine Sound Engineering
with Proven Performance!

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products



**Eaton Exclusive Forced-Flow Oiling System
Provides Positive Lubrication at all Speeds**



With Eaton exclusive Forced-Flow Oiling System, the flow of lubricant is instant, positive, and thorough at all truck speeds. Abundant lubrication is provided even at lowest operating speeds. In less than one revolution of the bevel gear oil begins to flow into the distributor tube; circulation increases as the demand for lubricant becomes greater. This high lubricating efficiency reduces friction and wear on moving parts and contributes to Eaton's exceptionally long life and trouble-free operation. Outstanding performance records are proof of Eaton quality and design. See your truck dealer for complete information.

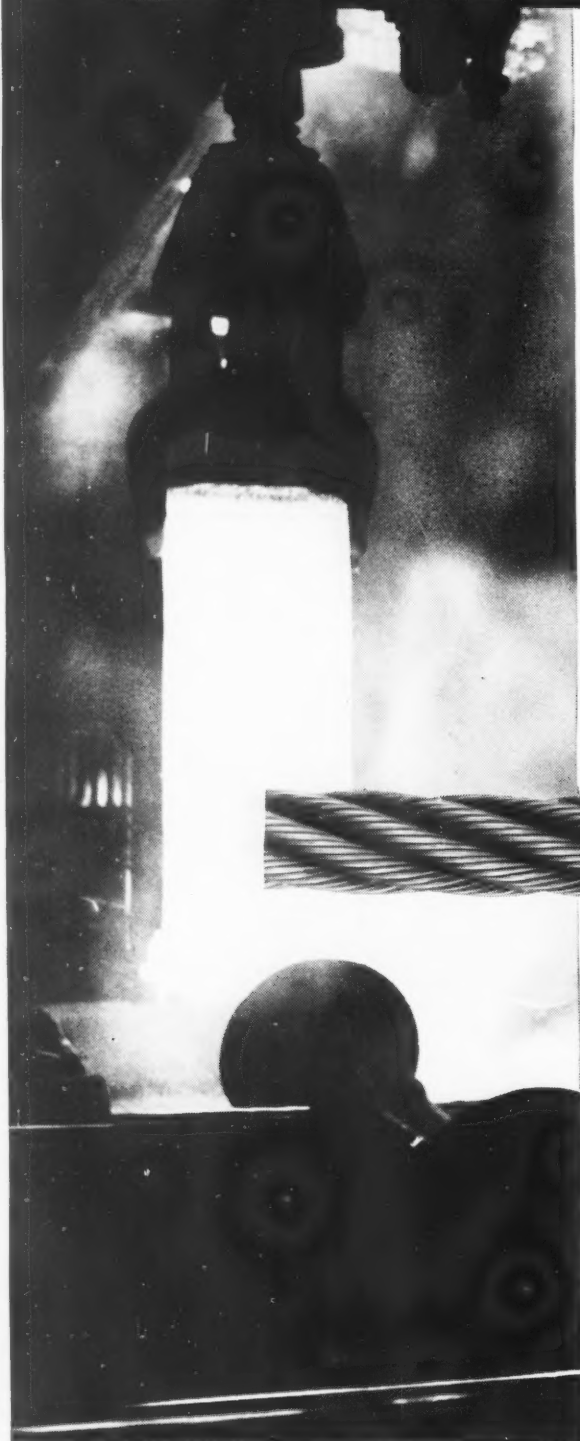
POWER WHEN YOU NEED IT—SPEED WHEN YOU WANT IT

EATON MANUFACTURING COMPANY

Axle Division

CLEVELAND, OHIO

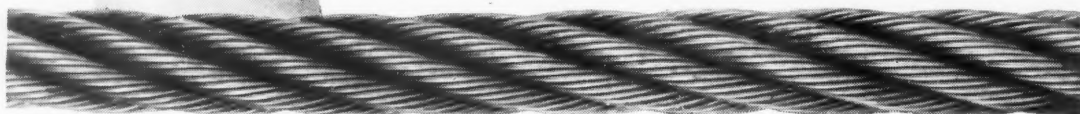
In Rope too — A Sound Heart Contributes to Longer Life



The quality of Wickwire Rope begins at the open hearth furnace where skilled metallurgists supervise the compounding of steel-making elements which give the finished product strength, stamina and toughness. Then, after the molten steel has taken form in ingot molds, the top of the steel block is discarded and only the sound heart of the ingot is used for rope wire.

From bloom -to billet -to rod -to wire -to finished rope, every step in the manufacture of Wickwire Rope is subject to our exacting controls. These controls, plus the service of distributors and Wickwire Rope engineers in all parts of the country, are your assurance of prompt service in solving your wire rope problems—are your assurance of quick delivery of the type of wire rope that will provide the utmost in performance, safety and long rope life.

Wickwire Rope is available in all sizes and constructions, both regular lay and WISSCOLAY *Preformed*.



THIS 82-PAGE BOOK ON WIRE ROPE IS FREE—WRITE FOR YOUR COPY TODAY!

Thousands of wire rope users have found that the information packed in the pages of "Know Your Ropes" has made their work easier. It's full of suggestions on proper selection, application and usage of wire rope. It's easy-to-read and profusely illustrated. For your free copy, write—Wire Rope Sales Office, Wickwire Spencer Steel, Palmer, Massachusetts.



WICKWIRE ROPE

A PRODUCT OF WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

WIRE ROPE SALES OFFICE AND PLANT—Palmer, Mass.

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PACIFIC COAST—The California Wire Cloth Corporation, Oakland 6, California



SWING FRICTIONS ARE *OUT*

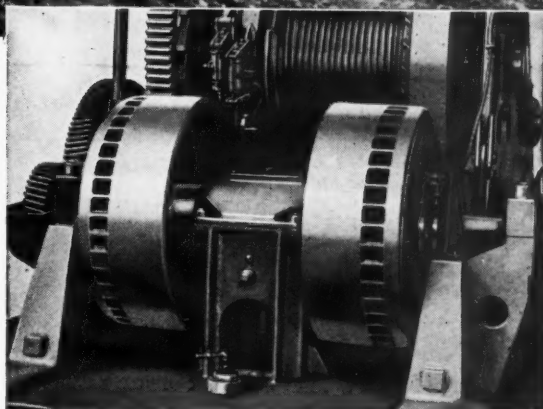
THE MAGNETORQUE'S *IN*



P&H 1055 owned by Lytle-Amis-Green at Potholes Dam, Columbia River Irrigation Project. Nine million yards of rock and dirt will make this the 4th longest dam in the U. S.

It's the downright simplicity of the P&H Magnetorque that makes such a big difference in overall operation. It makes swing frictions obsolete — puts an end to high maintenance costs — eliminates routine adjustments that normally rob machines of productive time.

The Magnetorque handles all swing motions electro-magnetically — yet without big motors or tricky, complex electrical equipment. It's simple, dependable, trouble free. And it's smooth — with fast, velvety starts and stops. No jolting and jarring to strain the swing assembly or other parts of the machine. Ask us to tell you where you can see one at work.



THE P&H MAGNETORQUE UNIT transmits power for swing electro-magnetically without mechanical contact between driving and driven members—without friction, without wear. It lasts the life of the machine.

P & H

EXCAVATORS
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HARNISCHFEEGER
CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS • HOISTS • WELDING ELECTRODES • MOTORS

Meet current sizing demands without extensive plant alterations install

AMERICAN Drop Cage CRUSHERS

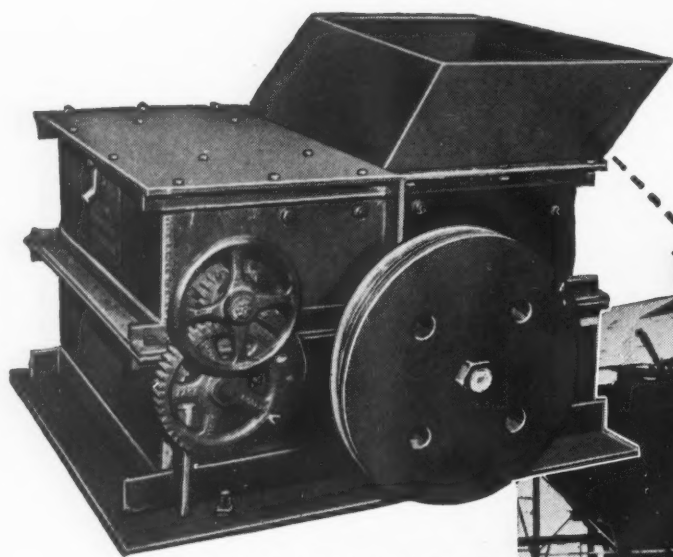


Illustration shows how the Perry Coal Company, at its St. Ellen Mine near O'Fallon, Illinois, gained adequate sizing flexibility without extensive alterations by installing an American Drop Cage Crusher under its nut coal bin.



To keep pace with today's changing conditions, mine preparation facilities must be able to adjust quickly and efficiently to rapidly fluctuating market needs. Operators throughout the country have found the answer to their need for *greater marketing flexibility* in installations of American Drop Cage Rolling Ring Crushers.

ECONOMICAL—AND PROFITABLE

New flexibility can be added to plants without extensive plant revision, and without disrupting production. Americans are designed to occupy the smallest possible area, with extremely low headroom requirements, assuring minimum installation costs. And—greater profits come

with the greater marketing flexibility, because Americans give high tonnage production and minimum undesirable fines.

QUICKER, MORE EFFICIENT SERVICE

With American Drop Cage Crushers installed under storage bins, coal can be sized and delivered into waiting trucks and cars—in one operation—promptly, efficiently. Where no sizing is needed, coal can by-pass the crusher.

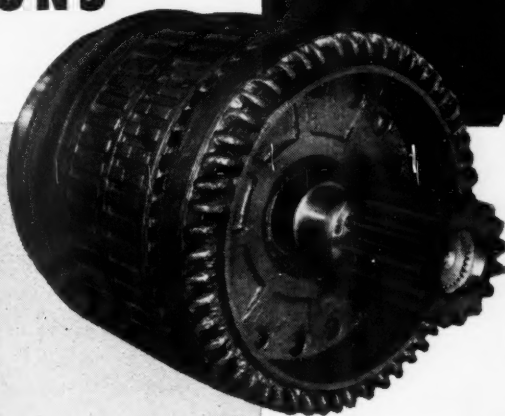
Americans are available in types to fit *your* operation—with capacities from 50 to 500 TPH. Why not find out how they can help make your coal marketing a more flexible, more profitable operation?

Send for Bulletin on Coal Crushing Data and Crusher Specifications

American PULVERIZER COMPANY
*Originators and Manufacturers of
Ring Crushers and Pulverizers*

1119 MACKLIND AVE.
ST. LOUIS 10, MO.

Genuine
**PITTSBURGH
 GEAR
 TAPER SERRATED
 SHAFTS and
 PINIONS**



**33 1/3%
 TO 50%**

**MORE STRENGTH
 AND LONGER LIFE!**

If you're shadowed by repeated breakage of shafts and pinions on locomotive armatures and other equipment exposed to tough service it's time you switched to Genuine Pittsburgh Gear TAPER SERRATED SHAFTS AND PINIONS. They'll give you a third to a half more strength and longer life than those old-fashioned key and keyway types. Elimination of keyways preserves full metal strength on both shaft and under root of teeth on pinion. Instead they are V-LOCKED all around and can't shake loose. Easy to apply or remove.

Now available in many sizes for most coal mining operations. Write for information, or

**SEE THE PITTSBURGH GEAR
 DISTRIBUTOR NEAR YOU**



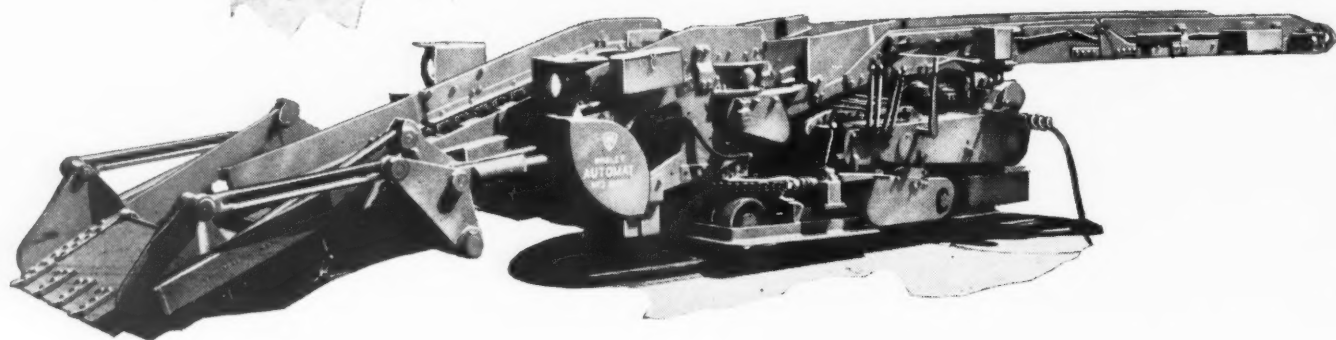
**PITTSBURGH GEAR
 COMPANY** | 27th & Smallman Streets
 PITTSBURGH 22, PA.

GEARS AND PARTS FOR LOADERS, CUTTERS, LOCOMOTIVES



*As a loader operator
I know from Experience...*

**- FOR SAFE LOADING IN
CLOSELY TIMBERED
PLACES, I'LL TAKE
THE "AUTOMAT"**



Remember, the "Automat" loads, in its stride, any lump of coal that will pass through your tippie, or any lump of rock your cars, aerial tram or larries can take.

**Myers
Whalely**

Ask the men who operate the loaders and they'll tell you why a Whaley "Automat" is safe. Safe loading is an all-important consideration for operators and miners alike. When you're working in closely timbered places and narrow entries, a sudden side-kicking of the rear conveyor can be serious. Knocked out timbers and falls, with possible injury to men, just doesn't happen around the "Automat". This is another reason why so many mining men have confidence in the Whaley "Automat". It's the only loader available with a loading head that gives you a vertical lift shovel action. All power is directed in a vertical plane, making side kicking impossible . . . making loading a job of maximum safety. For sure loading safety . . . for complete loader service, choose the shovel action "Automat". Myers-Whalely Co., Knoxville 6, Tenn.

Mechanical Loaders Exclusively for Over 40 Years

Top-dog 'dozer in the strip mines



This "Caterpillar" Diesel D7 Tractor, with No. 7S Bulldozer, is one of three such units used by Shasta Coal Corp., Bicknell, Ind., to build ramps and roads and clean up around the shovel. Price of the standard model D7 is \$8640; the No. 7S Bulldozer, \$1445; the No. 25 Rear Cable Control, \$1290, F.O.B. Peoria, subject to change without notice.

Talk to any owner or operator who has used "Caterpillar" Bulldozers on strip-mine jobs and you'll find he's a booster for these tough, easy-handling, high-production units.

They're perfectly matched to the "Caterpillar" Tractors that power them. And they're built to move more material, faster, at lower cost than you've ever seen it done before.

"Caterpillar" Bulldozers are equipped with either cable or hydraulic controls, and straight or angling blades. But all models have the exclusive "Caterpillar" blade design that *rolls* the load forward instead of merely shoving it. The result is more yardage handled in a day, with less wear and tear on the machine. And you have the added important advantage of complete service for both tractor and 'dozer from one well-equipped dealer.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL

ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

Everywhere MINES PROFIT BY USING

Case Histories Prove It



GOODMAN MANUFACTURING COMPANY

GOODMAN DUCKBILL-SHAKER CONVEYORS

PENNSYLVANIA

Uphill shakers working on a 10% grade in anthracite.

DS381

DS367

WE

CANADA

Wet face, gummy material, close timbering --- yet shakers proved profitable.

DS3411

WEST VIRGINIA

250 tons per shift, close to 30 tons per man, in coal rarely exceeding 34 inches.

DS3910

KENTUCKY

Power Duckbills increase yield per man in 42 inch coal, $3\frac{1}{2}$ cuts 40 feet wide, per shift with 3 man crew.

DS3760

DS4111

OHIO

Tonnage maintained with reduced crews when Duckbill-Shakers were installed. Costs also reduced.

DS431

VIRGINIA

DS408

WEST VIRGINIA

196,500 tons over one drive unit, $4\frac{1}{2}$ years without a replacement.

DS381

ILLINOIS

60 tons per face man, 40 tons per man for all crews engaged --- an outstanding performance.

DS407

VIRGINIA

DS4073

Moving coal 36 to 38 feet per minute over a 250 foot pan line with a 10% grade against the load in certain places.

WEST VIRGINIA

DS376

Too low for hand loading, too steep for mobile loaders; shaker conveyors did the job.

DS369

ALABAMA

Obtaining 60 tons per hour with uphill shakers.

DS3810

WYOMING

DS346

Over 200 Duckbill-Shakers operated by one company. Seam pitches up to 16 degrees.

UTAH

DS382

90 tons per hour with treacherous roof under cover up to 2000 feet in depth.

TENNESSEE

DS3712

2600 feet of heading and 5600 feet of rooms 56 feet wide driven with single installations without a breakdown.

ILLINOIS

DS4072

Power Duckbills load $12\frac{1}{2}$ tons per person employed at the mine including office help.

DS3711

COLORADO

18% slope, production of 40 tons per man. Recovery in excess of 90%.

DS407

PENNSYLVANIA

DS459

Long established name of mining valley changed to "Duckbill Hollow" two years after 1st of several shaker units installed.

KENTUCKY

HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

In England: UNITED STEEL COMPANIES, LTD.

The best way for you to determine the value of Goodman Duckbill-Shaker Conveyors in your mine is to call in a Goodman sales engineer. Without obligation, he will survey your workings and show you where and how this combined loading and transporting system can be installed and estimate the production capacity you can expect.



When overloads are the rule...

RPM Heavy Duty Motor Oil keeps trucks on the job

RPM Heavy Duty Motor Oil kept this big truck hauling payloads, while others using ordinary oil on the same job had to be pulled off for overhauls. When the last thousand yards of dirt were moved and its motor torn down, the rings were still free and pistons, cylinders and bearings showed minimum wear.

With RPM Heavy Duty Motor Oil in your heavy-duty equipment, you too can reduce wear in engines and prolong periods between overhauls. This outstanding oil contains a detergent that makes sure carbon, gum and lacquer are loosened and removed . . . keeps them dispersed in the oil so they flow out when it is drained. Other compounds help withstand the hottest operating temperatures, resist oxidation, sludging and stop foaming.

Let RPM Heavy Duty Motor Oil help keep your jobs on schedule.



Trademark "RPM"
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SPECIFY "ALLIS-CHALMERS" FOR—

"Certified" Motor Service!



**Independent Local Repair Shops Now Being Selected
to Give Better, Faster Service — "Certified"
Parts and Workmanship—on Allis-Chalmers Motors—
Transformers — Controls — and Pumps!**

THE NAME "ALLIS-CHALMERS" has always meant good motors, generously built for long life! Now you have an *added* reason for investing in Allis-Chalmers motors...

BETTER SERVICE

Throughout the U. S. qualified motor repair shops are being selected and authorized as Allis-Chalmers "Certified" Service Shops. Each will have trained personnel as well as complete facilities for servicing and repairing Allis-Chalmers motors to original factory-established standards!

"CERTIFIED" Service

Benefits You These Ways:

YOU GET FINEST PARTS. "Certified" Service Shops use genuine Allis-Chalmers repair parts — or parts of equal

quality! Each shop is given complete service information, including factory procedure and drawings, if necessary. Result: factory-like workmanship!

YOU GET FINEST SERVICE. Every Allis-Chalmers "Certified" Service Shop has been selected on the basis of its excellent reputation in the community. It's the kind of shop you *like* to do business with!

How To Get Allis-Chalmers "CERTIFIED" Service:

Right now most Allis-Chalmers "Certified" Service Shops are located in the larger U.S. industrial areas. But they're rapidly expanding. For service, call your nearby A-C District Office, or Authorized Dealer. If we do not have a Service Shop in your locality, we will recommend the one closest to you. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

A 2498

NEW MOTORS AVAILABLE!

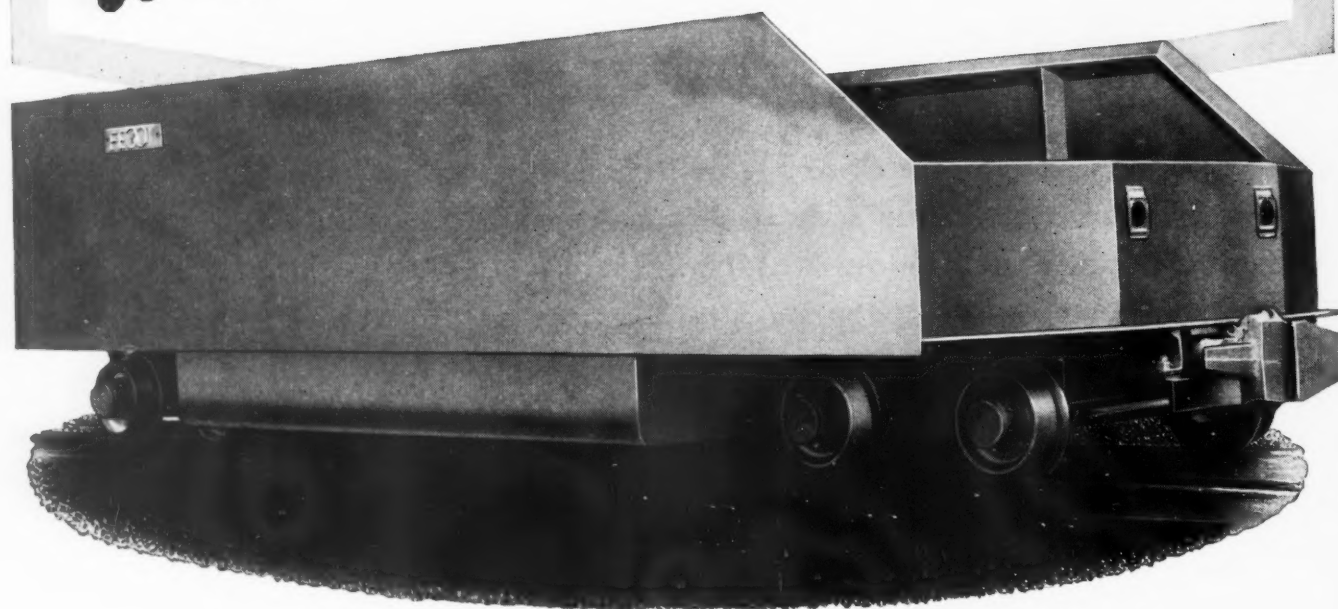
Many Sizes and Ratings
of Allis-Chalmers
Standard Squirrel-Cage
Motors from 1 hp up
are Now Available from
Stock. Call Your
A-C Authorized Dealer
or District Office.



ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products

Like 'Em ALL-STEEL ...and Welded?



Here's one unit of an order recently built and delivered by Bethlehem. It's an all-steel job (steel for durability!) and the body is welded throughout.

Note, too, that it's equipped with eight forged-steel wheels, roller-bearing trucks, and automatic self-centering couplers. It's big . . . 10-ton capacity . . . to handle the big loads so common nowadays.

This car is a good example of what Bethlehem can turn out in its modern, well-equipped shops. Whether you want end-dump or rotary-dump, high- or low-side cars, let us help you plan them. From blueprint to the finished product, you can rely on us for a job well done.

Bethlehem all-steel mine cars last for years. They

are built to absorb punishment day in, day out. As a result, your shop maintenance facilities need not be extensive; the cars go right on plugging, with little time out for repairs. See us for both eight- and four-wheel jobs in either welded or riveted types.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation



JOY

BELT CONVEYORS

engineered for
long life and
low maintenance

Shift after shift, Joy Belt Conveyors move a steady stream of coal over any length or type of installation—room, gathering or haulage—with a maximum of efficiency and service. Lost time is reduced to a minimum by fine engineering based on years of practical "know-how!"

**RUGGEDLY BUILT...
ECONOMICALLY
OPERATED**

*Consult
a Joy
Engineer*

JOY LOOP TAKE-UP

saves time when adjusting belt sections

There's less delay when you change the belt length of a Joy Belt Conveyor, for the loop enables you to do the job quickly and simply—just another reason for Joy superiority.

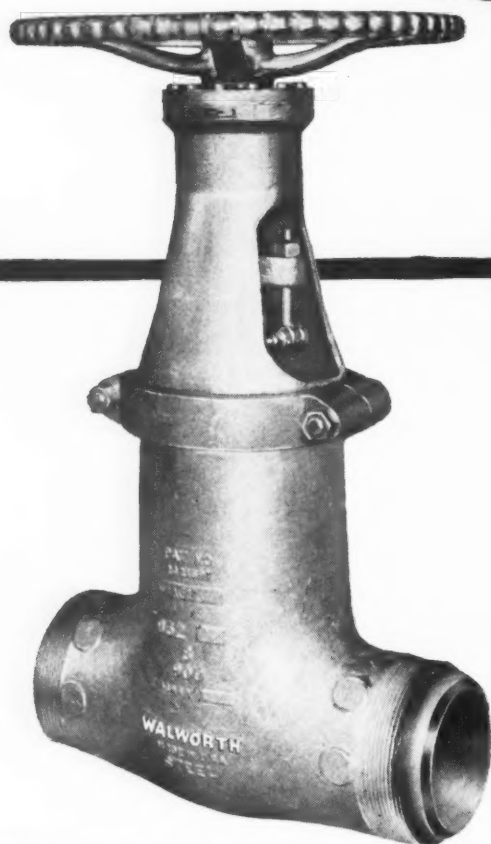
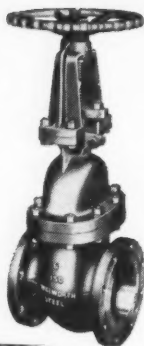


JOY MANUFACTURING CO.

GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.

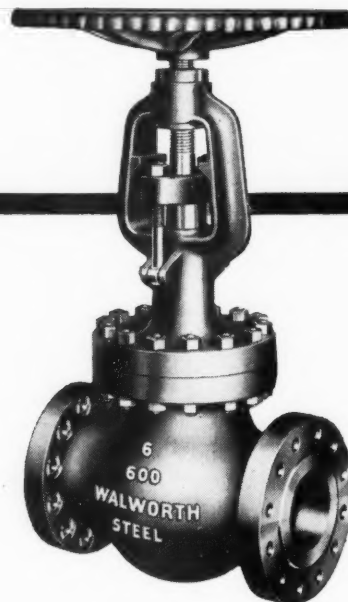
W&O CL-134

Walworth Series 150 Cast Steel Valves are tough and wear-resistant. Gate valves are available in sizes from 2" to 24", and globe valves in sizes 2" to 12".



Walworth Pressure-Seal Cast Steel Gate Valves exemplify the greatest improvement in high-pressure, high-temperature valve design. The internal pressure keeps the body-to-bonnet joint tight. Series 600: 1½" and larger — Series 900: 3" and larger — Series 1500: 1" and larger.

**Years of
trouble-free service
assured with . . .**



Walworth Series 600 Cast Steel Valves have strength and ability to resist wear. They assure long life and positive operation. Available in either gate or globe types — Gate: sizes 1½" to 18" — Globe: sizes 2" - 8".

WALWORTH cast steel valves

Walworth Cast Steel Valves have proved their ability to assure years of trouble-free, dependable service. Accurately threaded stems, deep stuffing boxes, streamlined ports, and heavy cast alloy steel walls are their top features.

You can get full information about Walworth's complete line of steel, iron, and bronze valves and fittings from our new Catalog 47. See your nearest Walworth distributor, or write on business stationery for your free copy.

Walworth Cast Steel Fittings are manufactured in a wide range of types and sizes to meet every requirement. They are made to the highest standards of quality, both as to dimensional accuracy and metallurgical properties.

WALWORTH valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Service-proved Efficiency and Utility
for every required application—

MODERN MINE RESCUE EQUIPMENT *by* **M.S.A**

M.S.A TWO-HOUR OXYGEN BREATHING APPARATUS

The famous M.S.A. McCaa two-hour apparatus, recognized standard of the mining industry, supplies complete respiratory protection to the wearer in unbreathable atmospheres for a minimum of two hours, under hard physical exertion. Approved by the U. S. Bureau of Mines, the Two-Hour Apparatus employs a high-pressure

oxygen cylinder, and a regenerator which purifies expired breath by removing the carbon dioxide, returning the oxygen content to the circulating system. This Apparatus is the cornerstone of mining protection and rescue programs. Write for Bulletin BB-3.

M.S.A SELF-RESCUER

A miniature gas mask, U. S. Bureau of Mines-approved, belt carried, hermetically sealed until used. This handy, popular equipment protects user against carbon monoxide after fire or explosion for at least 30 minutes. Bulletin EC-74.

H-H INHALATOR

Used in conjunction with artificial respiration, the H-H Inhalator speeds effectively the work of resuscitation by supplying correct oxygen-carbon dioxide mixture to the patient's lungs according to demand—gently, naturally, safely. The Instrument is officially accepted by the Council on Physical Medicine of the American Medical Association, approved by the American Gas Association and the Association of Police and Fire Surgeons. Write for descriptive Bulletin CA-9.

Other M.S.A. Rescue Equipment includes: M.S.A. High Pressure Oxygen Pumps . . . M.S.A. Lifeline Reels . . . M.S.A. Carbon Monoxide Detectors . . . M.S.A. Methane Detectors . . . M.S.A. Methane Testers . . . M.S.A. Wolf Flame Safety Lamps . . . M.S.A. Flame Safety Lamp Test Cabinets . . . M.S.A. Miner's First Aid Cabinets . . . U.S. Army Stretchers . . . M.S.A. Folding Stretcher Outfits . . . M.S.A. Blankets . . . M.S.A. Redi-Heat Block Portable Heat Units . . . Permissible Flash Lights . . . Edison Electric Cap Lamps and Hand Lamps. Write for descriptive information.



M.S.A *Chemox* OXYGEN BREATHING APPARATUS

Making its own oxygen with a single, replaceable canister as the wearer breathes, Chemox provides a minimum of 45 minutes' respiratory protection in unbreathable air, and is officially approved by the U.S. Bureau of Mines. Simple to use—Chemox supplements other oxygen breathing apparatus types, can be stored underground—and is always ready for immediate use. Bulletin B-14.



M.S.A ALL-SERVICE GAS MASK

Light in weight, comfortable to wear, U. S. Bureau of Mines-approved. Provides protection against gases (including carbon monoxide), fumes and smokes, wherever sufficient oxygen is present in air to support life. Long-lived All-Service canister is quickly replaceable when required—All-Vision facepiece can be put on and adjusted rapidly—sturdy harness contributes to wearing ease. Bulletin EA-8.

Write for detailed information on the equipment in which you are interested.

MINE SAFETY APPLIANCES COMPANY

BRADDOCK, THOMAS AND MEADE STREETS PITTSBURGH 8, PA.

District Representatives in Principal Cities

In Canada: MINE SAFETY APPLIANCES COMPANY OF CANADA LIMITED

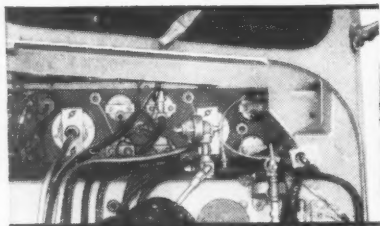
SOUTH AMERICAN HEADQUARTERS
Casilla 733 . . . Lima . . . Agents in Principal Cities

MINE SAFETY APPLIANCES CO. (S.A.) (PTY) LTD.
Johannesburg, South Africa . . . N'Dola—Northern Rhodesia





KENWORTH TRUCKS Breathe Easy.



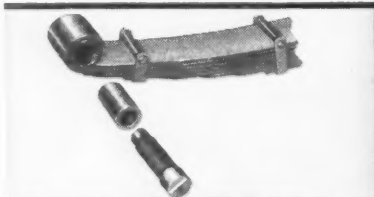
Kenworth's exclusive "inside-out dash" permits easy and speedy service of the instrument panel.



Complete illustrated parts and service manuals are provided all Kenworth truck owners.



Kenworth's continuous full length cab door hinges withstand heavy duty service.



Kenworth front spring pins and bushings are threaded and made of hardened steel.



Kenworth trucks breathe clean, fresh, cool air through an "open window", because the air cleaners on Kenworth trucks are outside mounted. Taking in cooler air from the outside rather than the hot air from under the hood, this outside mounted air cleaner increases the volumetric efficiency of the engine, resulting in materially better engine performance and a greater saving in fuel consumption. Another advantage of the outside mounting is its convenient location for servicing.

Kenworth is the only heavy duty truck manufacturer supplying outside mounted air cleaners as standard equipment on diesel and gasoline installations above 600 cubic inch displacement — just one more reason why *there's more* **WORTH in KENWORTH.**



KENWORTH

TRUCKS  BUSES

FACTORY AND HOME OFFICE: SEATTLE, U.S.A.
DISTRIBUTORS IN THE UNITED STATES AND MOST FOREIGN COUNTRIES

NEW! TERRIFIC!



presents a complete line of

Bull Dog V-Belts

designed to do your job better!

Fractional Horsepower
(FHP) V-Belts in Three
Standard Sections. Full
Range of Lengths



Industrial V-Belts in A,
B, C, D, and E Sections.
Full Range of Lengths

READ WHY BULL DOG V-BELTS MEAN "MORE POWER TO YOU"

Although these V-Belts are now offered on the general market for the first time, they represent years of grueling behind-the-scenes testing.

Ten years ago, BWH technologists perfected V-Belts that performed brilliantly in all laboratory tests. But that wasn't enough. BWH distributors were asked to pick jobs that were "Jonahs". And Bull Dog V-Belts were put through their paces in these tough spots, where other good belts hadn't been able to stand the gaff.

Time after time, Bull Dog V-Belts proved by actual long, trouble-free service that their improved construction means **MORE POWER TO YOU** on all types of installations!

BULL DOG V-BELTS HAVE THESE OUTSTANDING ADVANTAGES

1. *Exclusive Bull Dog Cord Section with Higher Tensile Strength* — able to carry the load and absorb sudden shocks.
2. *Low Stretch* — because Bull Dog Cords are processed in a new way. This means less slippage, fewer adjustments, longer belt life.
3. *Cool Running* — quality-controlled compounds developed in BWH laboratories don't crack or deteriorate under severe flexing.
4. *Wear-Resistant Covers* — made of bias-cut heavy fabric to protect the heart of the belt from dirt, grease, moisture.

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all principal cities

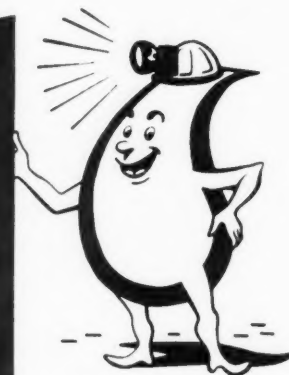
PLANT: CAMBRIDGE, MASS., U. S. A. • P. O. BOX 1071, BOSTON 3, MASS.



To eliminate the housewife's objection to dust...

Preparation must provide

**CLEAN
HANDLING**



**with PERMATREAT
Coal Spray**

DUST
PROOFING

LESS
WINDAGE
LOSS

PERMANENT
ODORLESS
TREATMENT

BETTER
STOKER
FEED

FREEZE
PROOFING



Dust is the housewife's one great objection to the use of coal in today's fight among competitive fuels. This situation is becoming more and more important in the modern home where basements are planned for laundry, recreation and activities other than a heating plant.

Progressive coal dealers are profiting and building new business by featuring oil-treated coals. They agree, as do most mine operators, that oil treatment is the most effective method of controlling dust in handling and firing coal.

Let our representative tell you how PERMATREAT COAL SPRAY can alleviate the dust problem and help build a new market for your coals.

**ASHLAND OIL
& REFINING COMPANY**
Ashland, Kentucky

What is Dependability?



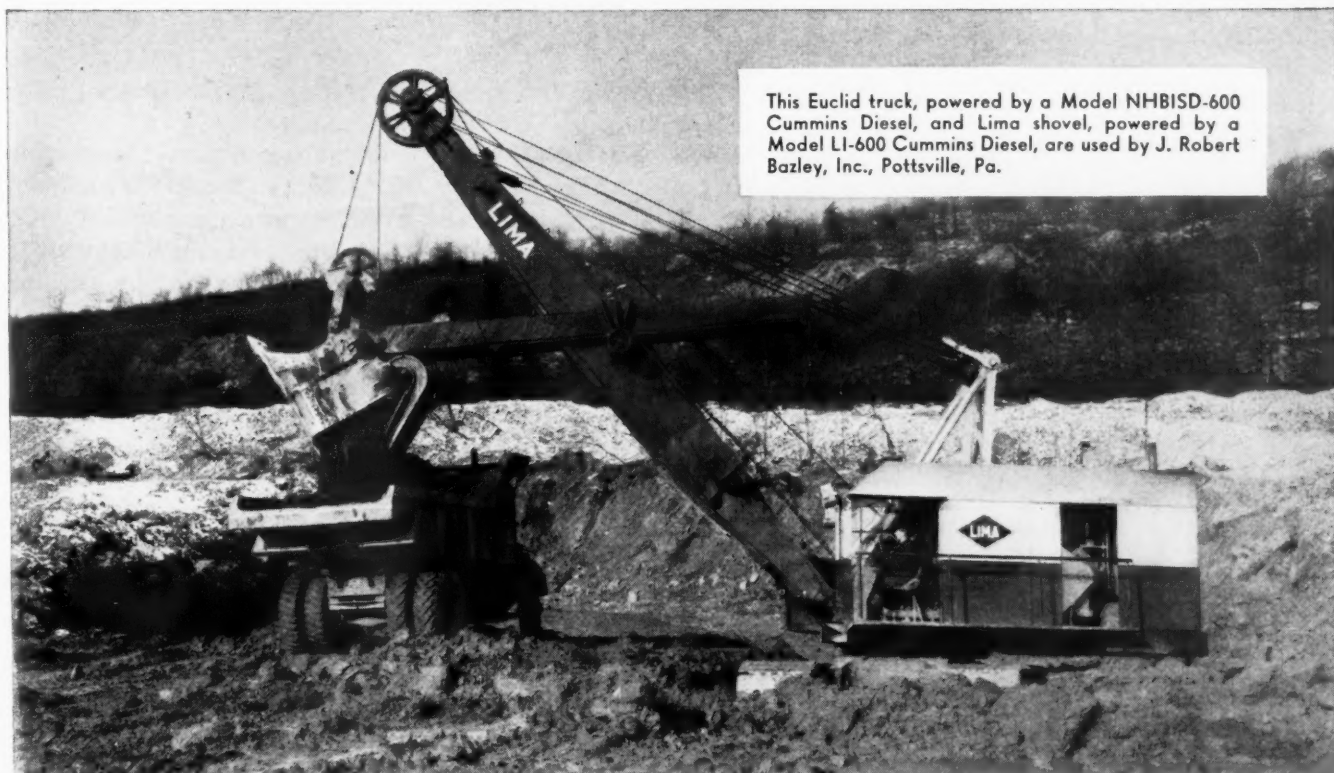
When you get right down to it: what is a dependable diesel?

It's an engine that gives reliable, day-after-day operation with minimum maintenance . . . the kind of operation J. Robert Bazley, Inc., Pottsville, Pa., gets from more than 50 Cummins Diesels.

One of the largest stripping operators in the Pennsylvania anthracite fields, Bazley's trucks and shovels remove heaping loads of overburden on constant, profit-making schedules. The 50 Cummins Diesels power Euclid, Mack, and Sterling trucks, and Lima shovels.

On the Mammoth Vein at the Logan stripping, where overburden yardage totals more than 9,500,000 cubic yards, Cummins-powered equipment is proving to be the economical means of removing both the top layer of loose overburden and a 35-foot layer of hard pan.

CUMMINS ENGINE COMPANY, INC.
COLUMBUS, INDIANA



This Euclid truck, powered by a Model NHBISD-600 Cummins Diesel, and Lima shovel, powered by a Model LI-600 Cummins Diesel, are used by J. Robert Bazley, Inc., Pottsville, Pa.

TOUGHEST TEST OF A TRUCK!

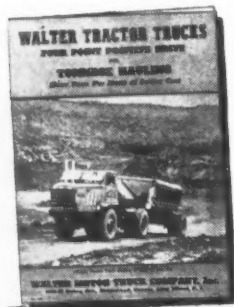
**Hauling 30-60 ton
payloads under
all pit conditions!**



FOR the most productive, low-cost open pit hauling, you need trucks that keep huge tonnage moving fast—that haul on soft dirt, mud, snow, slippery surfaces and steep grades—that maneuver sharply in tight spots—that are safe and easy to handle—that are rugged and dependable, on the job day in and day out.

Are there such trucks? Yes! Walter Tractor Trucks have been meeting these requirements for years on the toughest layouts in open pit iron and coal mines. With the great power and unfailing, super-traction of the Walter 4-Point Positive Drive, huge loads keep flowing from shovel to plant under all weather and running conditions.

Operating reports from mines using Walter Tractor Trucks show more tons hauled per hour, at lower cost per ton; fewer hauling units required; steady operation when other trucks are stalled by bad weather and running conditions; from 50 to 100% longer tire life; much less wear on mine roads; and reduced road maintenance cost.



● **WRITE FOR NEW FOLDER, "Walter Tractor Trucks for High Tonnage Hauling"**, which gives the complete story, shows models, specifications, etc.

WALTER MOTOR TRUCK COMPANY
1001 Irving Ave., Ridgewood 27, Queens, L.I., N.Y.

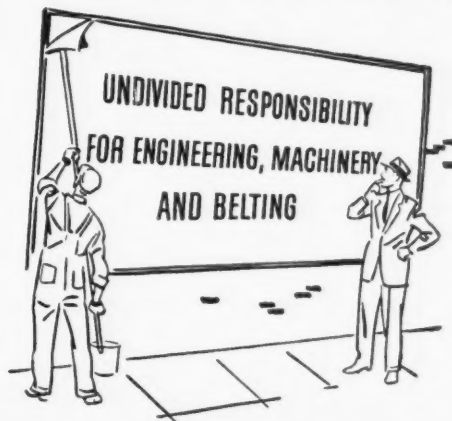
**WALTER
TRACTOR TRUCKS**

How to choose a mine conveyor



1 Choose it like you do a car

You buy your car as a completely engineered unit—not the engine from one source and the chassis from another. Keep that same principle in mind when you choose a mine conveyor. Buy it as a complete unit—buy the machinery from the same source from which you buy the belting.



2 Rely on one source for everything

Machinery and belting—like your car's engine and chassis—must be engineered to work together. So rely on one manufacturer for both elements. That way you are sure of undivided responsibility. You know that your conveyor will last longer.

3 Specify a Hewitt-Robins Conveyor

The Hewitt-Robins Mine Conveyor is the only one you can buy as a complete "package." You get machinery and belting engineered as a unit... and installed by Hewitt-Robins' service engineers. Hewitt-Robins is the only company that offers you this undivided responsibility.



4 Remember this fact—

A Hewitt-Robins Conveyor lasts longer because it is the only one engineered, manufactured, and installed as a complete unit.

Ask us to tell you more about the Hewitt-Robins Mine Conveyor—and the advantages of unit responsibility—proved in practice for nearly 60 years. Address Hewitt Rubber Division, 240 Kensington Avenue, Buffalo 5, N. Y.—or Robins Conveyors Division, Passaic, N. J.

Hewitt-Robins Mine Conveyors

made by HEWITT-ROBINS Incorporated



No other dragline bucket



**...can match the digging capacity
of a PAGE AUTOMATIC!**

Page AUTOMATICS dig right in at the first pull of the drag rope and get a full load within one to three bucket lengths regardless of the depth—20 ft., 100 ft., or more. This means that most of your operations are under or near the end of the boom point where the minimum amount of power is required for hoisting the load.

Perfect balance of the AUTOMATIC assures positive control whether loading or dumping. Quick loading features of AUTO-

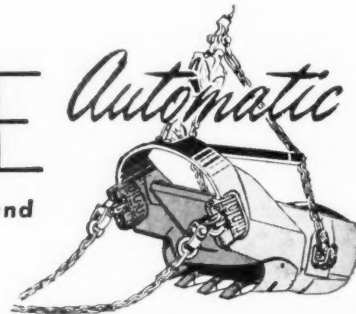
MATIC buckets mean less wear and maintenance on the bucket, cables, and the dragline as well as minimum operator fatigue.

Hundreds of dragline operators in all kinds of digging have found that their AUTOMATICS dig more yards at a lower cost per yard than any other buckets they have ever used. For all the facts, see your construction equipment distributor or write for big, new free booklet, "How to Get the Most Out of Your Page Automatic Dragline Bucket."

PAGE ENGINEERING COMPANY
Clearing Post Office
Chicago, Ill.

PAGE

**DRAGLINE BUCKETS and
WALKING DRAGLINES**



Speed Changes are Quick, Exact with Vari-Pitch Sheaves!



Speed to Fit the Job! These roller mills, equipped with *Texrope Vari-Pitch* sheaves for motion control can be set instantly to exact speed for best production under all operating conditions. Can you profit by accurate speed control? *Texrope Vari-Pitch* drives are simply and economically applied to machine tools, pumps, blowers, conveyors or other machines.

Save Money With "Pre-Engineered" Texrope Drives

You can solve 90% of all V-belt drive problems, from 1 to 150 hp, with economical stock *Texrope* V-belts and sheaves. The *one best* drive is selected quickly and simply from a new 144-page manual listing 22,000 "Pre-Engineered" drives. Bulletin 20B6956. ALLIS-CHALMERS, MILWAUKEE. *Texrope*, *Super-7*, *Texsteel*, *Texdrive*, *Magic-Grip* and *Vari-Pitch* are Allis-Chalmers trademarks.

A Complete Range of Products

Super-7 V-belts	5 types... sizes to suit every power transmission job	
Texsteel, Texdrive, Magic-Grip	Sheaves in a full range of sizes and grooves	
Vari-Pitch Sheaves	Exact variations in speed — Stationary or Motion control	
Speed Changers	Speed variations up to 375% at the turn of a crank	

Texrope Super-7 V-belts result from the cooperative research of Allis-Chalmers and B. F. Goodrich; and are sold only by A-C dealers and offices.



A 2428

ALLIS-CHALMERS

Originators of the Multiple V-belt Drive for Industry

The **SIDE** of a V-BELT

is what **GRIPS** the pulley

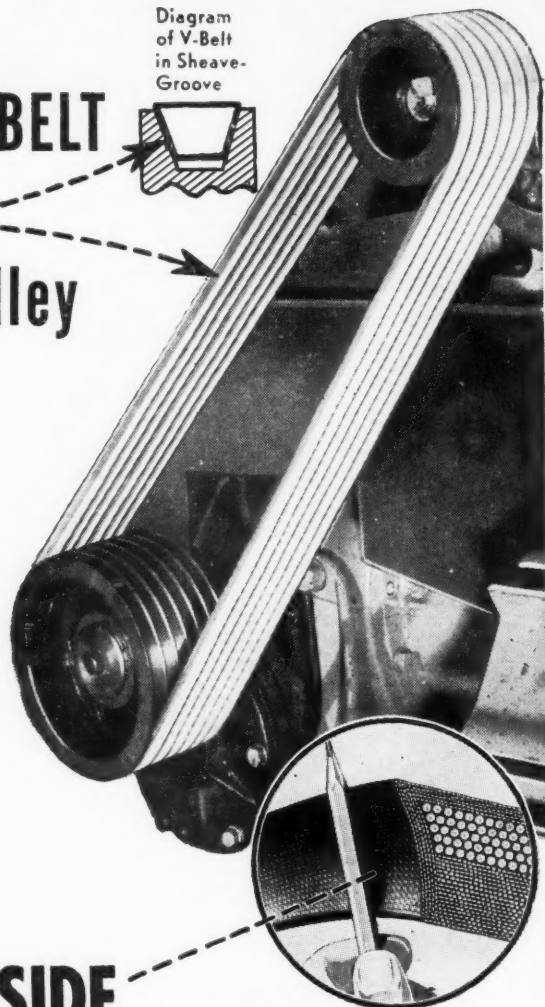
Naturally,
it **GETS** the **WEAR!**

Any one familiar with V-Belt drives knows that the sides of a V-Belt are what really get the wear.

It's the *sides* that grip the pulley. They *pick up* all the power from the driver pulley, *transmit* that power to the belt as a whole and then, once more, they *deliver* the power to the driven pulley. And, clearly, it's the *sides*—and *only* the sides—that take the wear against the sheave-groove wall.

That is why you have always noticed that the *sidewall* of the *ordinary* V-Belt is the part that *wears out first*—and, naturally, if you prolong the life of the sidewall, you *lengthen* the life of the belt!

Diagram of V-Belt in Sheave-Groove



Now See How the **CONCAVE SIDE** (A GATES PATENT) **SAVES Sidewall Wear and Lengthens Belt Life!**

The simple diagrams on the left show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the *middle* of the sides. The diagrams show also why the Patented Concave Side greatly *lengthens the life* of the *sidewalls* of Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belt can possibly give.

Saving **SEWALL WEAR**

is more important **NOW** than ever before. ..

Now that Gates **SPECIALIZED** Research has resulted in Super Vulco Ropes capable of carrying much heavier loads—fully 40% higher horsepower ratings—the sidewall of the belt is called upon to do even more work in transmitting these heavier loads to the pulley. Naturally, with heavier loading on the sidewall, the life-prolonging Concave Side is more important now than ever before!



THE MARK OF
SPECIALIZED RESEARCH

THE GATES RUBBER COMPANY Denver, U. S. A.

"The World's Largest Makers of V-Belts"

487



Fig 1
Straight Sided
V-Belt



Fig 1-A
How Straight Sided
V-Belt Bulges
When Bending Around
Its Pulley

You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.



Fig 2
Gates V-Belt with
Patented Concave
Sidewall



Fig 2-A
Showing How Concave Side
of Gates V-Belt Straightens
to Make Perfect Fit in
Sheave Groove When Belt
Is Bending Over Pulley

No Bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!

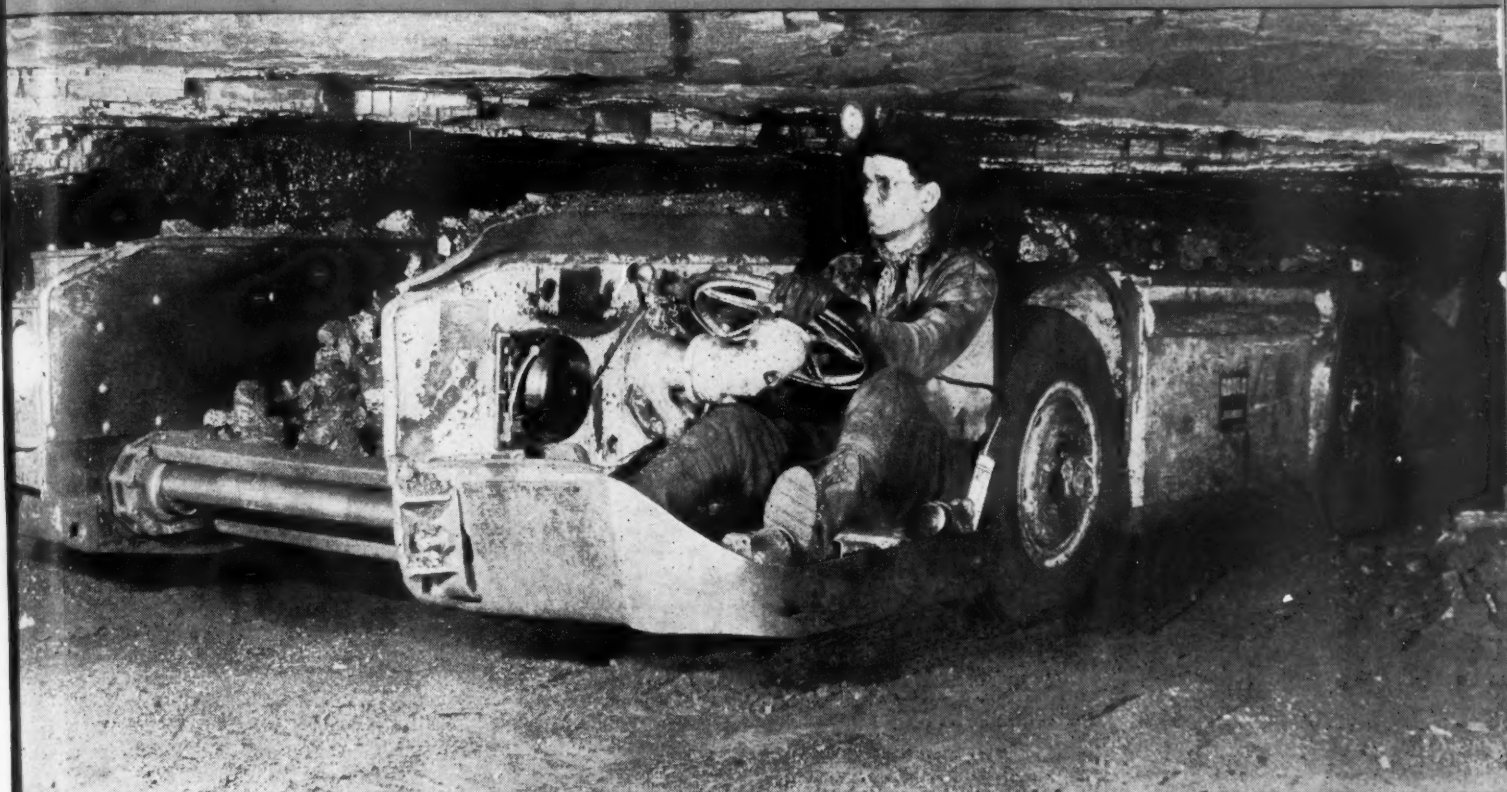
GATES VULCO ROPE DRIVES

Engineering Offices
and Jobber Stocks

IN ALL INDUSTRIAL CENTERS

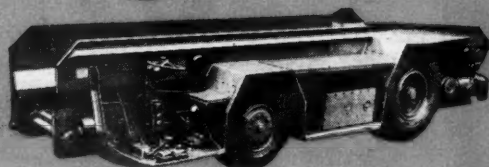
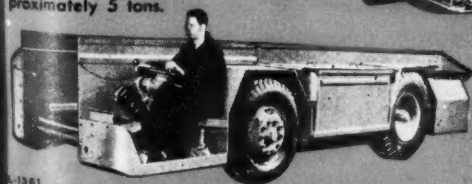
of the U. S. and
71 Foreign Countries

**INCREASES TONNAGE...
LOWERS PRODUCTION COSTS!**



JOY SHUTTLE CARS

Joy 42" Shuttle Car for medium seams. Capacity approximately 5 tons.



Joy 60" Shuttle Car for seams six feet or more high. Capacity 5 to 10 tons.

Your production will swing upward and your costs will go down with Joy Shuttle Cars speeding the movement of coal from the face to conveyor or mine car. Models for high and low seams!

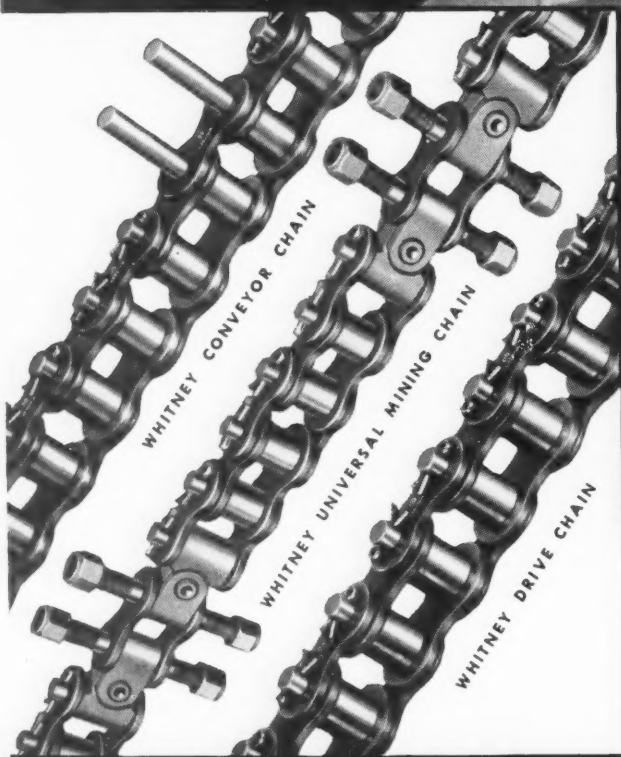
Consult a Joy Engineer



JOY MANUFACTURING CO.

GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.

FOR LOWEST COST-PER-TON PRODUCTION



**USE
WHITNEY
Chain
Drives**



Put Whitney Chain Drives to work in your mine operations above and below ground and watch your tonnage and profits increase.

These tough loader, conveyor and drive chains have the built-in stamina needed to stand the severe use encountered in both strip and underground mining. Precision made of heat-treated steel, Whitney Chains have ample strength to keep working under every condition. They resist shock loads without breakage... keep equipment operating... and cut your maintenance costs by providing exceptionally long wearing life. Whitney Cut Tooth Sprockets complete the overall drive efficiency... insure smoother operations.

Standardize on Whitney Chains and Cut Tooth Sprockets... the all steel drives... and you'll get higher tonnage and more profits. Write for information.

WHITNEY CHAIN & MFG. CO.

Division of Whitney-Hanson Industries, Inc.

210 HAMILTON STREET, HARTFORD 2, CONNECTICUT

Bit Cost Reduced 91 $\frac{2}{3}$ % Per Ton!

—for Ohio Mine
Using **KENNAMETAL**
Cutting Machine Bits

A Moxahala, Ohio mine, operating in the No. 6 seam, reports that the bit cost per ton of coal mined has been reduced from 12¢ to 1¢ by using Kennametal cutting machine bits.

In the number 9 seam in Kentucky, bit cost has been reduced up to two-thirds. In the Powellton, Pittsburgh, and Winifrede seams in West Virginia, mines report reductions that average 50%.

These are typical performance facts—hundreds of mines are recording similar savings in material costs by using Kennametal bits—the only bits that have cutting edges of solid Kennametal, the hardest metal used in mining.

The cost of bits is important. Of equal importance in reducing mining costs are the other benefits gained by using Kennametal bits, as described at the left.

These benefits add up to better balanced operations. The cutting crew cuts coal instead of changing bits . . . keeps coal available for loading and hauling. There's less unproductive down time and waiting all along the line.

Our mining engineer in your district will be glad to show you what Kennametal bits can do in your mine. Write for a demonstration. Mining Division, Kennametal Inc., Latrobe, Pa.



*Are you Getting these Benefits
of using **KENNAMETAL BITS?****

Reduction in bit cost
ranging up to 91 $\frac{2}{3}$ %.

•
The number of bit
changes required, and
the cost of changing
and spotting bits re-
duced as much as 96%.

The cost of sharpening
bits lowered as much
as 97%.

•
Power consumption
cut from 30% to 50%.

•
Places cut from 10% to
30% faster.

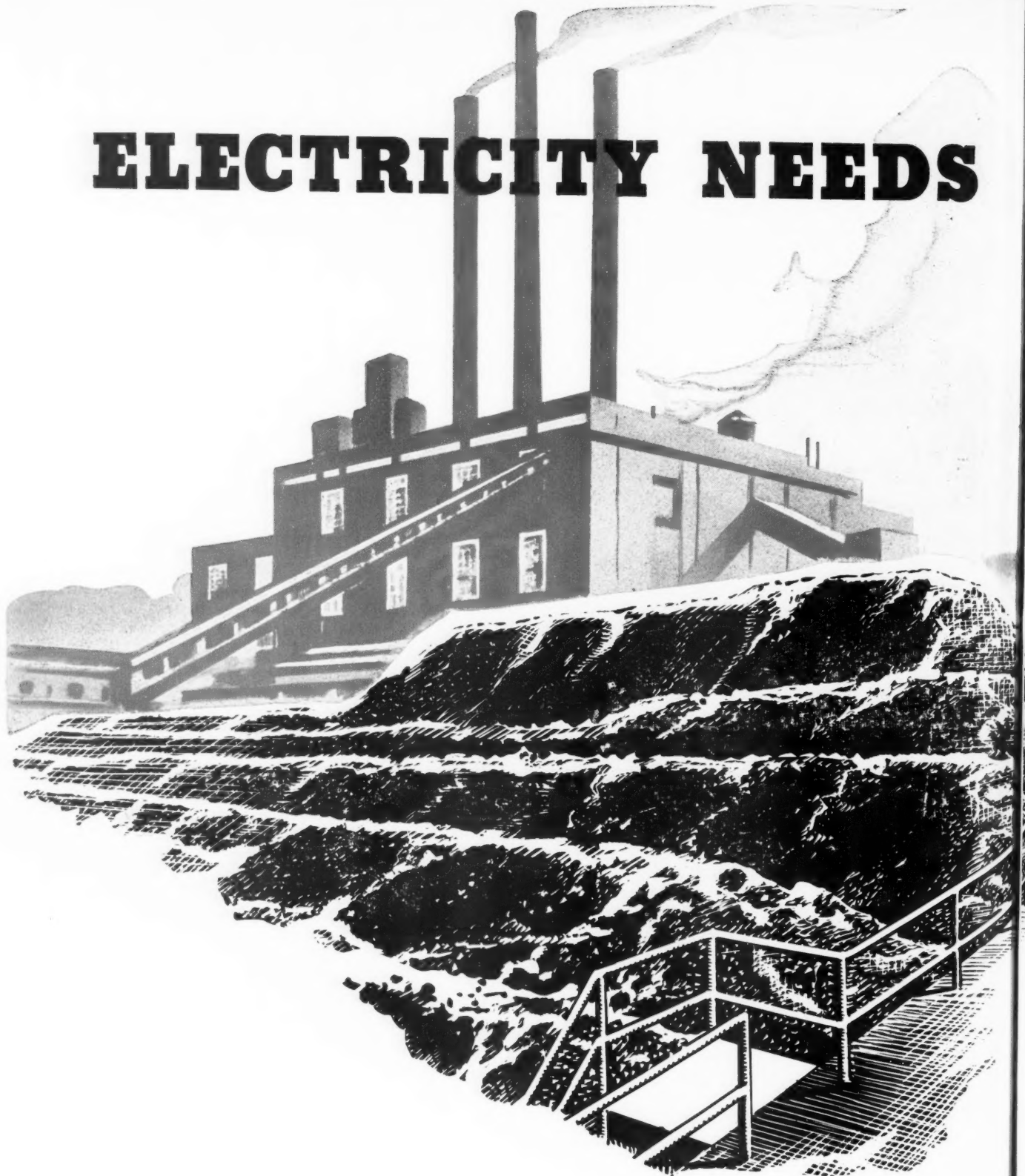
*Percentages are taken from actual performance studies.

Ask our Field Engineer
to Demonstrate

KENNAMETAL

THE WORLD'S LARGEST MANUFACTURER OF CEMENTED CARBIDE MINING TOOLS

ELECTRICITY NEEDS



A M E R I C A

MORE COAL

...35 Million Tons!



Ninety-three million tons! That's how much coal the electric light and power companies used in 1947. And this year they'll need far more.

For America's electrical appetite is growing fast. It means more *millions of mine car loads*, and that's where the coal operator comes in.

Your job is to get more coal out, faster and at lower cost. That's where **A.C.F.** comes in. For modern **A.C.F.** mine cars can dump a load of coal in five seconds. That means busy loading machines, and lower costs per ton.

Talk over your coal-hauling problems with an **A.C.F.** representative. There's one near you, ready to lend a hand.

American Car and Foundry Co., New York · Chicago · Cleveland · Washington · St. Louis · Philadelphia · Huntington, W. Va. · Berwick, Pa. · Pittsburgh · San Francisco.

A.C.F.

MINE CARS

for Greater Coal Output

N E E D S M O R E C O A L

Special Offer

AIRCO'S NEW HARDFACING ALLOYS



... a trial assortment for only \$2⁹⁵

Your name on the coupon below will bring you — at a special introductory price of only \$2.95 — a trial assortment of Airco's NEW line of Hardfacing Alloys.

You will receive:

1. The NEW Aircolite Hardfacing Alloy (for oxyacetylene and electric application) — especially recommended for pulverizer hammer, coke crusher rolls, and so on, subjected to severe abrasion and medium impact.
2. The NEW Airco Electric Self Hardening Alloy — for bucket teeth, sizing screens and similar equipment subjected to severe impact and abrasion.
3. Instructions for these two alloys, plus a booklet describing Airco's line of Hardfacing Alloys.

... and of vital importance to you — you will receive enough of these rods to see for yourself how the NEW Airco Hardfacing Alloys extend the service life and improve the operating efficiency of your equipment.

Since this special price is good for a short time only — expiring December 31, 1948 — we suggest that you fill in and mail the coupon below—NOW! Send it to: Air Reduction, 60 East 42nd Street, New York 17, N. Y. On West Coast: Air Reduction Pacific Company, San Francisco 4, Calif. Represented Internationally by Airco Export Corporation.

Mail this coupon today for your special assortment of the New Airco Hardfacing Alloys



AIR REDUCTION

Offices in All Principal Cities

Headquarters for Oxygen, Acetylene and Other Gases... Carbide... Gas Welding and Cutting Machines, Apparatus and Supplies... Arc Welders, Electrodes and Accessories

Key CA

Air Reduction

60 East 42nd Street, New York 17, N. Y.

☐ Here is my check for \$2.95 — send me the special package of Airco's Hardfacing Alloys.

☐ Send me your booklet: "Airco Hardfacing Alloys" — at NO cost to me.

Firm

Signed By

Address

City & State



HOW ROEFLAT SLASHES SCREENING COSTS!

AT THE LEFT, ABOVE, you see part of an ordinary wire screen—woven like cloth—each wire has a continuous wave...and in service, *the high spots get the wear.*

At the right, you see a new Roebling way of making wire screens...the wire lies *flat* except for short crimps at the intersections. This modern screen is called ROEFLAT...has 75 per cent more wearing surface...prolongs the working life of screens as much as 90 per cent!

And ROEFLAT Aggregate Wire Screens save you money in other ways. Their smooth, level

surface lessens clogging and blinding. Their precision openings assure uniform grading and increase your screening efficiency.

Wherever ROEFLAT is recommended, its advantages can be enjoyed in practically any construction, such as ROETON, ROESLOT or square mesh, with $\frac{3}{8}$ " openings or larger. Investigate ROEFLAT before placing your next order for screens. Write for Catalog W-903.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

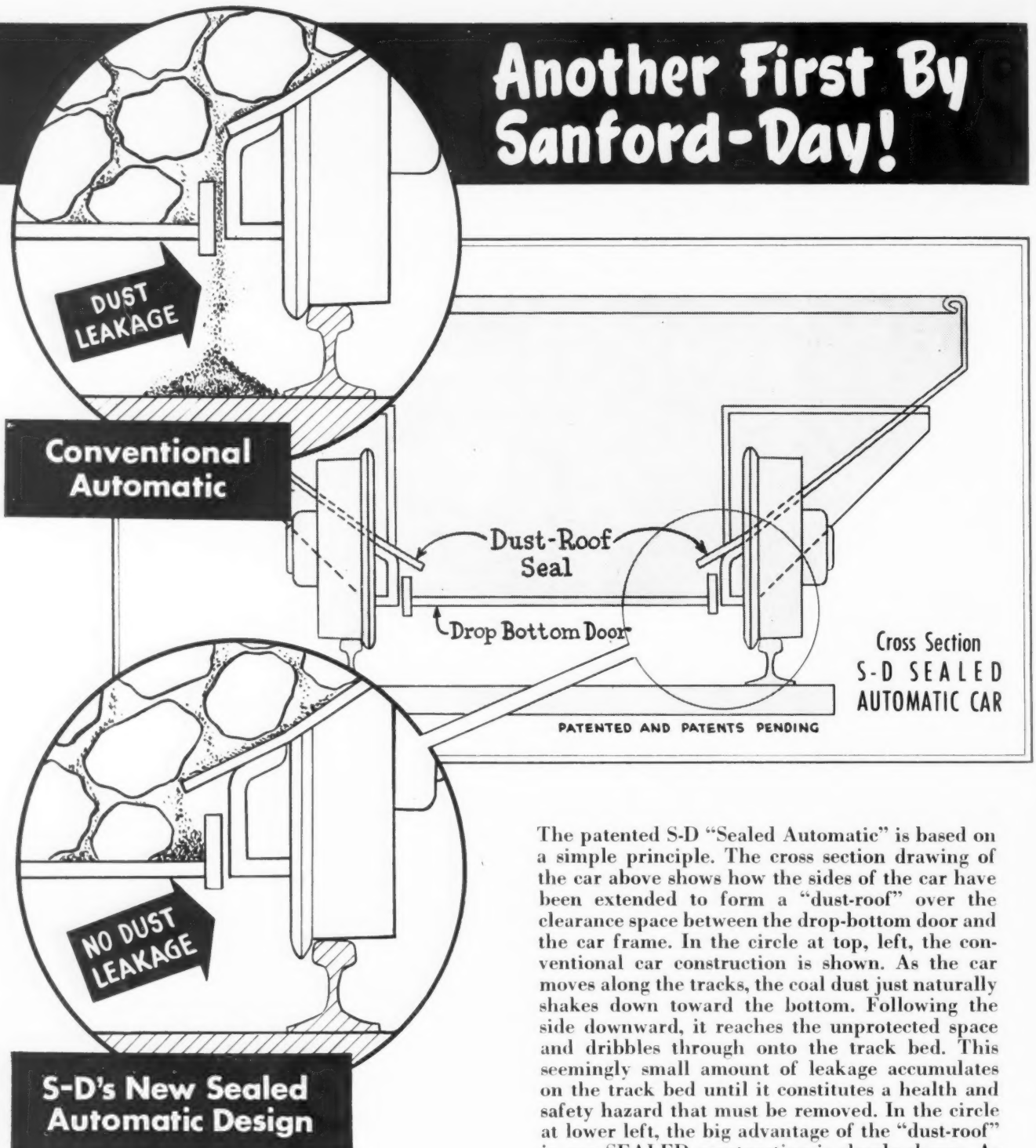
★ WIRE ROPE AND STRAND ★ FITTINGS ★ SLINGS
★ SUSPENSION BRIDGES AND CABLES ★ AIRCORD,
AIRCORD TERMINALS AND AIR CONTROLS ★ AERIAL WIRE
ROPE SYSTEMS ★ ELECTRICAL WIRE AND CABLE
★ SKI LIFTS ★ HARD, ANNEALED OR TEMPERED
HIGH AND LOW CARBON FINE AND SPECIALTY WIRE,
FLAT WIRE, COLD ROLLED STRIP AND
COLD ROLLED SPRING STEEL ★ SCREEN, HARDWARE
AND INDUSTRIAL WIRE CLOTH ★ LAWN MOWERS

ROEBLING

A CENTURY OF CONFIDENCE



Another First By Sanford-Day!



The patented S-D "Sealed Automatic" is based on a simple principle. The cross section drawing of the car above shows how the sides of the car have been extended to form a "dust-roof" over the clearance space between the drop-bottom door and the car frame. In the circle at top, left, the conventional car construction is shown. As the car moves along the tracks, the coal dust just naturally shakes down toward the bottom. Following the side downward, it reaches the unprotected space and dribbles through onto the track bed. This seemingly small amount of leakage accumulates on the track bed until it constitutes a health and safety hazard that must be removed. In the circle at lower left, the big advantage of the "dust-roof" in our SEALED construction is clearly shown. As this car vibrates the dust down the side of the car, it is carried across the open space by the "dust-roof" and is deposited in the bottom of door to be dumped in the bin with the other coal. Seals are provided at wheel hoods to insure a POSITIVE SEAL against any coal dust leakage. For further information on this revolutionary development write today.

20 Car loads of "Automatics" from -

SANFORD-DAY IRON WORKS, Inc. Knoxville 9, Tenn.

Our New "Sealed Automatic" Stops Dust Leakage and Track Clean-up



After years of experiments and testing by our engineers, we now are furnishing the mining industry a completely sealed drop-bottom mine car that eliminates coal dust leakage entirely. Yes, the S-D "Sealed Automatic" keeps coal dust from sifting out and accumulating on the track . . . eliminates costly clean-up and means safer, dustless haulage. Many mines, where dust is a problem, spend well over \$10,000 every year in track clean-up alone. Let us help you eliminate your clean-up expense.

S-D "Automatics" have always led the field but now they're better than ever! You still get the same big capacity and automatic unloading. You get our improved long-life construction and our foolproof "Jerkout" unlatching device that operates underneath the car. Now, with this revolutionary, money-saving SEALED construction, you get the greatest money saving car the industry has ever known.



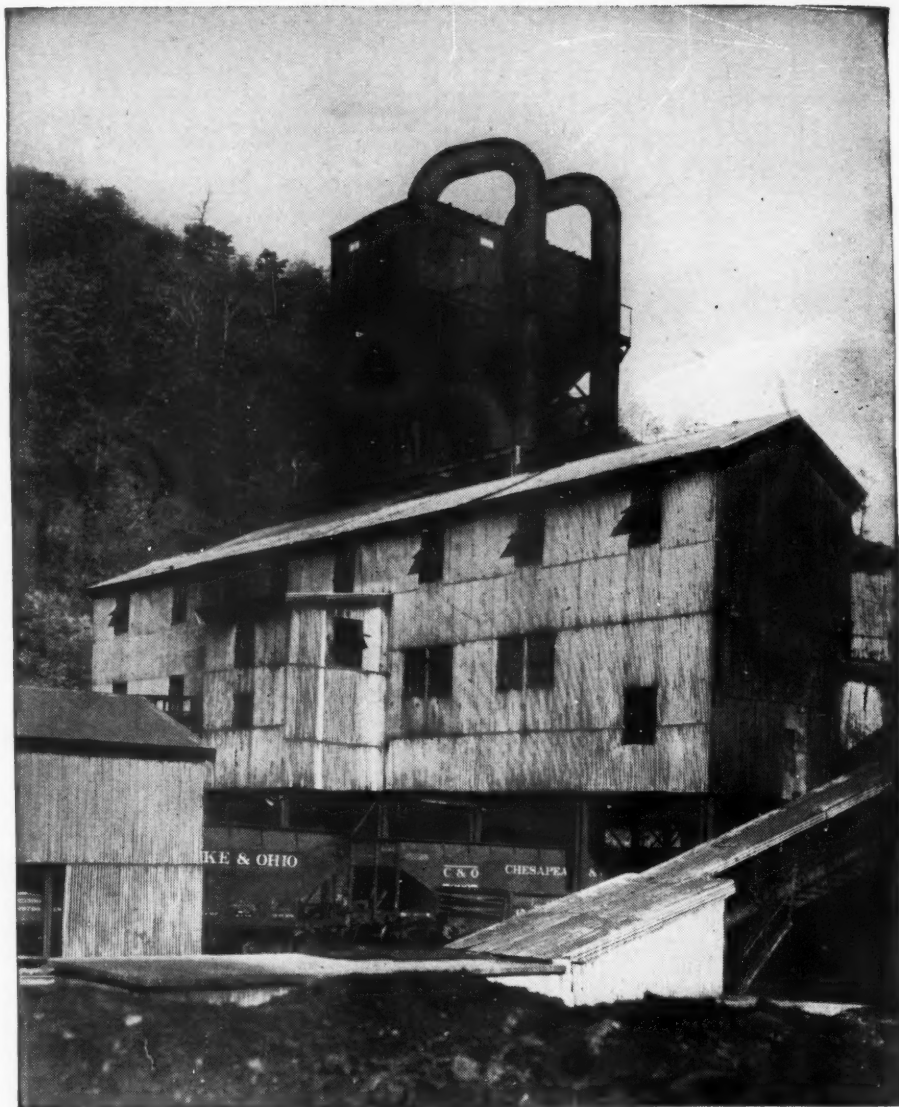
Here is a new S-D "Sealed Automatic." It is 100% dust sealed, even at the wheel hoods. Regardless of the capacity you require—from 1½ to 30 tons—you can have our "Sealed Automatic" car.

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For many years a "Pangborn" has been the recognized method of effectively collecting the fine coal dust that is produced in the operation of tipples, dry cleaning, de-dusting

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With this background of successful experience in the coal industry, Pangborn engineers offer you an effective and economical solution to your dust problems.

Write for free Bulletin 909A, "The Control of Industrial Dust". Address Pangborn, *world's largest manufacturer of dust control and blast cleaning equipment*, at 288 Pangborn Boulevard, Hagerstown, Maryland.

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SO DO YOUR MINE CABLES...

Maybe you can't entirely eliminate electrical overloading of your mine cables, but you will find that a few precautions like those suggested below may help.



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You wouldn't try to put a 13 collar around a 16 neck. You'd get hot under the collar if you did... so do cables when they are not big enough for the job. Be sure your cables can handle the load without "cooking".



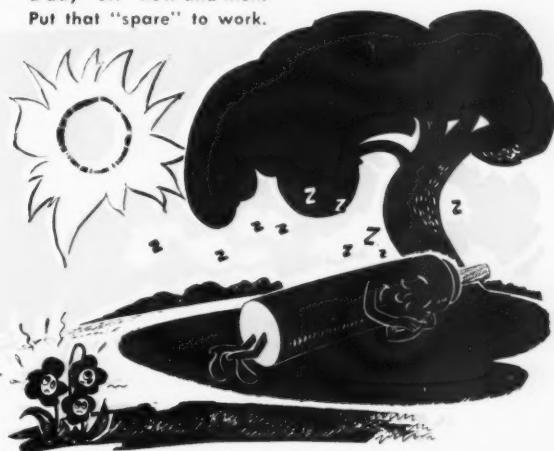
Are Your Terminals on the LOOSE?

Be sure that you inspect cable terminals regularly. Loose connections build up resistance and cause cable overheating. Have all terminal connections tight for a safe and full power supply.

Copies of these helpful hints are available on individual posters in convenient 11"x14" size, suitable for bulletin board use throughout your properties. These posters contain no advertising and are offered, free of charge, as a service to the mining industry and in the interest of mine safety and economical operation. Simply use the coupon below, or write to Department C, Rome Cable Corporation, Rome, New York, for your requirements.

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14-BU—Designed for high production in low veins. Made in 30½", 33" and 36" heights.

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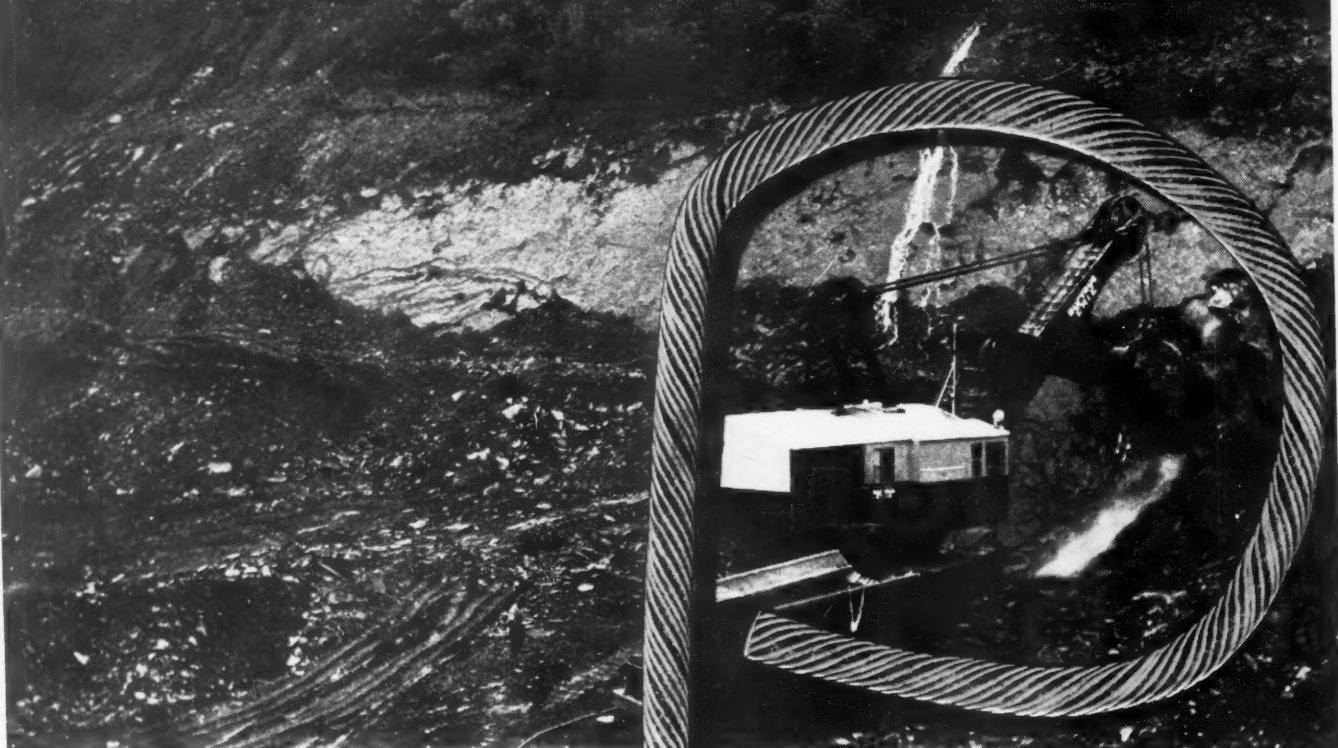


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JULY, 1947

IVAN A. GIVEN, EDITOR

Still Unsolved

ANY FORMER HOPE that the bituminous industry might have made significant progress toward settling its contractual and other relations with representatives of its employees was pretty well dispelled by developments since the first of the year. To be sure, a new contract and an agreement on pensions finally were reached without a total stoppage in the commercial mines—but only under the watchful eye of a fact-finding board and after assorted court rulings. However, the joint statement of operators and union representatives following the contract signing gave some new hope of future improvement in contract relations. Strengthening that hope by concrete action is now the big task ahead of the industry.

One great bar to progress, as has been pointed out on numerous occasions, is the difficulty of dealing with the monopoly power ceded to labor-union officials by the Wagner Act. In an industry as basic as coal, exercise of that power to its full extent quickly lays a heavy burden on the economy, in turn generating intervention a la Martin and Bridges and their forerunners in government and without. The difficulty will remain as long as the basic principle of the Wagner Act is embedded in federal law. Perhaps the difficulty might still remain even if the Wagner Act were repealed tomorrow in view of the patterns that have been set, but at least repeal would provide an opportunity to search for a new and better approach to the problem.

However helpful a new legislative and administrative approach might be, nevertheless the temper of the times still puts a premium on skill in conducting relations with employees and their representatives on both an industry- as well as company-wide basis. If there is no change in the legislative and administrative approach, such skill is even more essential. It is no secret that the reaction of the public and of the miner to coal's past efforts has been less than favorable. In fact, both are inclined to sum up coal's contribution about in this fashion: "All they do is say no."

Coal men know that this statement is somewhat less than accurate but its prevalence is evidence

that something needs to be added. In other words, negotiating an agreement or settling a dispute is more than getting together with the other side. The group that appears in the better light with the public and with the employees has, naturally, the better chance of getting needed facts and recommendations accepted. That involves not only making the facts known but also a willingness to offer benefits voluntarily when it appears that the time is right. What form a new negotiating and union-relations set-up should take is, of course, a matter for careful study, although the permanent organization headed by a qualified man with full authority and the necessary staff has much to commend it. At any rate, the working out of a new system is becoming even more necessary if the industry is to avoid additional trouble in the future.

New Hazard

ONE OF THE "PRIVILEGES" of these times of bigger if not better government is trying to find the money to pay more and more taxes. Desperate is perhaps not exactly the right word for the efforts of the tax gatherers, but certainly they are continually reaching out to get the greater sums of money local, state and federal governments seem to feel are necessary for the happiness of those on the public payroll. Now, more and more of them are turning to coal mining as an easy source of revenue, with school-district and county authorities in the lead in formulating proposals for levies not only on coal production but on equipment, specifically stripping units.

Perhaps coal's improved position has something to do with the attention it is attracting. Regardless of the reason, however, taxing or trying to tax coal production up to 25c. per ton or more is becoming increasingly popular. Unless some steps can be taken to head off taxing bodies, it is quite possible that an avalanche of tonnage and equipment taxes could fall on the industry in the relatively near future. Now is not too soon to take the necessary steps to prevent action that might seriously prejudice coal's position in the future.



MANAGEMENT CLUBS develop leaders among supervisors. Here, officers and club members at Omar, W.Va., thrash out some problems at the December business session as they make plans for the next year's program.

Building Leaders Via

Better Foremanship and Self-Improvement the Goals—
How Local Problems and Club Projects Build Interest—
National Affiliation Adds to Benefits—Foremen's Gains
Listed and Future Needs Examined

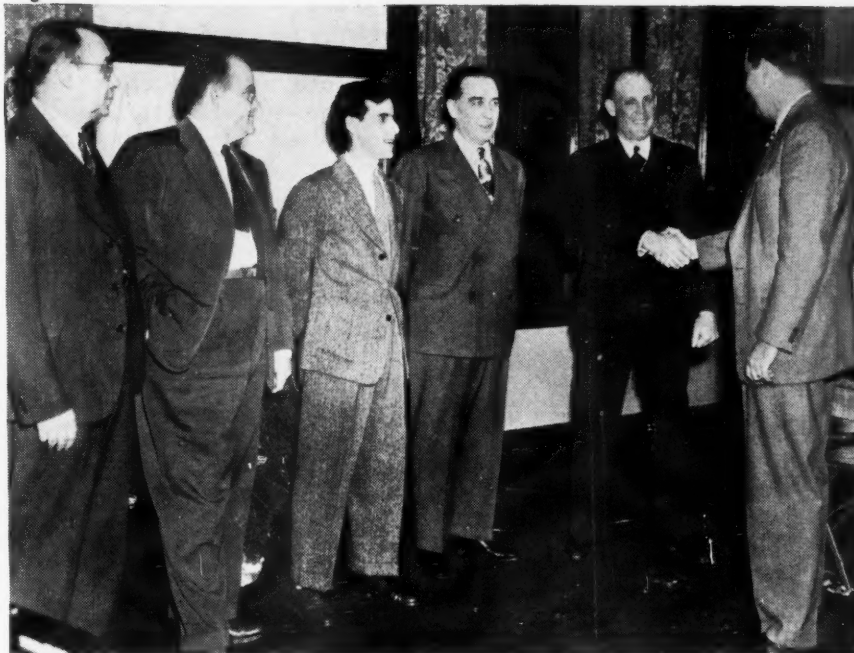
MANAGEMENT CLUBS are affording foremen in coal mining a new opportunity for increasing their supervisory ability and their value to themselves and to their companies. These clubs benefit foremen not only by helping them to help themselves but by providing other helps through affiliation with a national organization comprising



PLANNING PROGRAMS IS A BIG JOB. R. D. Graham Sr. (left), secretary, and Rhein Tinsley, president, talk things over with H. W. Lowe, N.A.F. director, in the company offices at Holden, W.Va.



OFFICERS POSE AT HOLDEN—seated, Orville McNeil (left), vice president, and Rhein Tinsley, president; standing, W. E. Welch, treasurer, and R. D. Graham Sr., secretary.



TOP BRASS TAKES PART. T. R. Workman, company vice president (third from right), looks on as new officers are installed at Omar.

Foremen's Clubs

foremen and management men in many other industries. And along with helping foremen in their daily work, these clubs make it easier for foremen to gear their operations with top-management planning and vice versa.

Informal meetings among foremen themselves and also with top management have long been a factor in coal mining. Their importance naturally has been growing as the industry progresses and it therefore is natural that informal meetings

and operation should develop into more formal organization with clearer and more specific aims and affiliation with similar groups in other industries. For these and other reasons, these new management clubs are opening doors for foremen and are strengthening the bond with other levels of management.

Through these groups, the first of which was organized in coal mining a little more than a year ago, foremen have a better chance to:

1. Learn the art of good management.
2. Get the facts about their company.
3. Understand each other's problems.
4. Pick up ideas from supervisors in other industries.
5. Sell the coal industry to outsiders.
6. Make themselves and their abilities known to top management.

First management clubs of this kind to be formed in the coal industry were those at operations of the Island Creek Coal Co., Holden, W. Va., in October, 1946. Shortly after that, in December, clubs were formed among supervisory men at the West Virginia Coal & Coke Corp., Omar, W. Va., and at Bartley, W. Va., where supervisors of the Pond Creek Pocahontas Coal Co. and the Marianna Smokeless Coal Co. formed the Pond Creek-Marianna Supervisors' Association. The first such club formed in Kentucky also was organized in December,

Code of Ethics—National Association of Foremen

1. The foreman should recognize that every man above, beside or below has an inherent desire to do good work and to be a useful and respected citizen. Until he has considered every possible motive, he should not assume that any man wants to do anything less than his best.

2. The foreman should keep an open mind on all subjects and strive to maintain a broad and balanced outlook. He should always be willing to recognize merit in another's ideas.

3. The foreman should deal fairly with all his associates in the company. Being in an important position, he should assume responsibility for his own mistakes and refrain from shifting blame to others.

4. The foreman should strive to understand the principles of business which make for the success or failure of industry. He

should pass on to his men all the fundamentals of business principles so they can see, for themselves, their own relation to the general scheme.

5. The foreman should keep informed as to the latest development in equipment and processes. He should recommend or put into effect such methods as will produce improved quality and lower costs for his product and improve working conditions.

6. The foreman must feel that one phase of his profession is to help working people obtain maximum satisfaction from life.

7. The foreman should endeavor to earn, and carefully guard, a reputation for good moral character, good citizenship and common honesty and he should support and promote all the uplifting influences of the community.



BALANCING THE BOOKS AT OMAR—R. S. Watkins (left), secretary, Frank Wilson, vice president, and C. E. Reed, treasurer, make plans for the new year and work on the budget.



SWAPPING STORIES at a meeting of the club at Omar—O. M. Holliday (left), town-properties manager; J. A. Sarsfield, superintendent, No. 19 mine; K. B. Hart, chief clerk; and Mr. Workman.

1946, at the Princess Elkhorn Coal Co., David, Ky. Among West Virginia coal-operating companies, there now are nine management clubs, all of them affiliated with the National Association of Foremen. In addition, supervisors of the Island Creek Coal Co., in Huntington, W. Va., belong to a city-wide management club that draws members from several industries in and near the city. This group, however, has no connection with the mine clubs except through its affiliation with the national organization.

Why were these clubs formed, and how? What do they do? What do they mean in terms of labor relations, production, exchange of information and skill in foremanship?

As a rule, two-thirds or more of a company's foremen come up through the ranks. Moving up from below is not always easy to do nor is new responsibility always inviting. A miner who becomes a foreman gives up his union and the protection it offers. His promotion draws a clear line between him and

the men he used to work with. Where his work once was planned for him, he now is on his own—he plans the job and gives the orders. His habits and thinking, formerly shaped or at least colored by his union, must be adapted to his new position as a management man.

The management club offers a foreman something in exchange for the things he gave up to become a supervisor and smoothes the way for his orientation in the ranks of management. To take the place of the union's protection, he gains the help and friendship of experienced management men from his own level up to the top. Asking them questions and hearing them talk, he learns how older foremen plan their work for least friction and best efficiency. He hears about his company's accomplishments and plans and he feels good because he is "in on the know." Soon, the pattern of management thinking becomes clear to him and he accepts his new responsibilities as a challenge to his best efforts.

However, new foremen are not the only ones to gain from a management club. Old hands at supervision sometimes need a shot in the arm. Without a forum to trade stories and ideas, it is easy to go stale on the job. Without contact with other foremen, a man gets smug about his own methods, with the result that he stands still promotion-wise, his men's complaints grow up into full-sized grievances and productivity, if it moves at all, moves down instead of up.

These are good reasons for organizing a foremen's club—to help new foremen adjust themselves and to keep old foremen on their toes. Other big reasons, as well as benefits, will appear as the club matures and will come to light farther along in this discussion.

Forming a Foremen's Club

Searching for something that would fill these needs, key supervisors of the Island Creek Coal Co., Holden, W. Va., got in touch with officials of the National Association of Foremen for preliminary talks. The set-up looked good after the first quick study but to make sure, five interested men, including a superintendent and four foremen down the line, went to St. Louis, Mo., in September, 1946, to look in on the annual national convention of the association. They came back to Holden and added up what they had learned.

They had found out, among other things, that the National Association of Foremen, first formed in 1924, counts some 35,000 members representing key industries in 36 states; that the organization is governed by a board of directors, experts in labor relations, foremanship and production, who are elected on a state-wide basis, with one national director for each 500 members within a state; that advisory help is available for setting up local units and that expert speakers are on call for monthly meetings. They learned also that the National Association of Foremen takes no part in collective bargaining either nationally or locally and that individual members are urged to study, singly and in groups, all economic problems of industry and the nation.

The visitors from Holden were impressed with the quarter-century reservoir of experience in supervision and with the variety of helps available to member clubs, including seminars in foremanship, regional conferences, placement assistance and library service for in-

dividual members, club officer training, films and a monthly magazine called *Supervision*, which is sent to every member of the club. Membership in the National Association of Foremen, they discovered, is made up of 13 percent top management, 8 percent engineers, personnel managers and staff officials and 79 percent supervisors, foremen and department heads.

Selling the Club Idea

Finally, the broad vision and enthusiasm that sparked the St. Louis convention looked good against the background of the association's broad objectives, stated as follows:

1. To help in the promotion of better foremanship.
2. To study the needs and opportunities of industry.
3. To make each foreman a power for good in his own organization and community.
4. To create, compile and distribute foremanship information which will be of direct value in the promotion of better industrial relations.

Sold on the value of a management club, these five Island Creek men took their story to top management, where a hitherto quiet and unassuming section foreman won top-level backing for the proposed organization, as well as valuable recognition for himself, by his sales talk.

With the help of representatives from the National Association of Foremen, the local men framed a constitution and by-laws. Membership was opened to all supervisors in all the company's operations near Holden — mines, tipples, shops, stores, dairy, housing, sanitation, etc.—from the level of section foreman and fireboss up to and including the company's president but, since section foremen were expected to draw biggest benefits from the club, office-holding was limited to those at the mine-foreman level and below. Dues were fixed at a sum to include a \$4-per-member payment to the national organization for services, speakers and the monthly magazine, with enough left over for local expenses and special projects.

Members of the Holden club who attended the first meeting after organization heard Sen. Joseph H. Ball, of Minnesota, talk about foremen and labor relations. Since then, they have heard talks by DeLoss Walker, well-known laymen's economist; Clyde R. Powell, public relations and safety expert of the Endicott Johnson Corp., who showed, by means of hypnotism and a line of

entertaining patter, how safety depends on controlled thinking; three speakers from the National Association of Foremen; and C. R. Mabley, Jr., general manager, industrial sales, Island Creek Coal Sales Co. Other monthly meetings have featured films—"The Magic of Coal," for example—a stag picnic, a ladies' night, an open-air band concert and a Christmas carnival. Usually, there is food at these meetings. Always there is a chance to swap stories, learn about each other's problems and meet new friends.

Supervisors at operations of the West Virginia Coal & Coke Corp., Omar, W. Va., attracted by early reports about the Island Creek management club, drove to nearby Holden at the invitation of the club there to see for themselves. They liked what they saw and returned to Omar to set up their own organization. Once more, district representatives of the national association were called in to help draw up a constitution and by-laws and start the program going. Since December, 1946, when the group at Omar formally organized, monthly meetings on Sunday afternoons have been featured by speakers sent by the national group. A buffet supper with soft drinks has been served at each meeting.

Ideals and Local Projects

In substance, the objectives of the clubs at Holden and Omar are identical. The constitution of the West Virginia Coal & Coke Management Club states them this way: "The improvement of its members as industrial executives and the advancement of management." This is a simpler statement of the Code of Ethics of the National Association of Foremen, the principles of which are:

1. Recognition of every man's inherent desire to do good work.
2. Open-mindedness.
3. Fair dealing with management men.
4. Broad understanding of business principles.
5. Practical knowledge.
6. Sincere interest in working people.
7. Character building.

Regular monthly meetings, with local and outside speakers, open forums, question periods and informal story-trading are educational and stimulating and make up the machinery for attaining the goals stated in the constitution.

However, the local club leaders were quick to see that concrete

goals, set up on the local level, would produce best results. Along these lines, the club at Omar now is working to outfit and staff a playground for children in the community. The playground will be near an old storehouse soon to be remodeled by the company for a foremen's clubhouse and furnished by the club with bowling alleys, pool tables and a library. Money for these two projects and others, such as flowers for foremen who may be hospitalized, comes not only from dues but also from club-sponsored softball games and special showings of movies at Omar.

The Island Creek club at Holden, to stress the need of training for good supervision, has set up five \$100 scholarships for youngsters in the four high schools in the immediate area. First awards were made in the spring of 1948. The contest is open to all, regardless of color, race or creed. Winners were selected on the basis of scholarship, participation in student-body activities, athletic performance and an essay on some subject like the following: "How Education Can Help My Future in Industry," "Why I Want to Be a Supervisor" and "How I Can Become a Responsible Manager in Industry." The club's program committee gave scholarship winners a spot in the spring program, after awards were made.

In addition to framing the scholarship plan, the Holden club, together with the local Lions Club, is testing the eyes of all children in the community and recommending glasses for those who need them.

To finance these projects, the Island Creek club supplements income from dues by money-making activities like the raffling of a \$395 radio-phonograph at the July, 1947, open-air meeting, to which men brought their wives. The crowd put away more than 650 lb. of barbecue and heard Kenneth Yost, a speaker sent especially for the occasion by the National Association of Foremen, talk on "What America Means to You."

Interest Runs High

Management-club membership is voluntary. However, the high percentage of members as against eligibles suggests that supervisors find the meetings interesting and the time well spent. At Holden, out of 310 men who are eligible for the club, 276 are members—about 92 percent. At Omar, among 201 eligible operating supervisors, 189 belong to the club—over 94 percent—and among 255 total supervisors

eligible, 215 are enrolled—about 84 percent.

To keep attendance high and interest at a good pitch, the Island Creek club officers polled the members in December to find out what sort of program would rouse most interest in 1948. Monthly meetings now are geared to the results of this survey.

The clubs at Omar and Holden have similar officers. Those at Holden are: president, Rhein Tinsley, assistant night foreman, No. 23 mine; vice president, Orville McNeil, section foreman, No. 1 mine; secretary, Richard D. Graham, Sr., manager of unemployment compensation; and treasurer, W. E. Welch, mine clerk, No. 15 mine.

At Omar, officers are: president, Oscar Sizemore, haulage foreman, No. 5 mine; vice president, Frank Wilson, plant account clerk; secretary, R. S. Watkins, assistant purchasing agent; and treasurer, C. E. Reed, purchasing agent, Junior Mercantile Stores.

Each club has a board of control drawn from all company operations—mines, stores, tipples, engineering, housing, etc.—and standing committees on finance, membership, public relations and special projects.

Coal Men Win National Note

Marking the swift recognition coal men have earned in the national organization, two West Virginia men now are on the board of directors of the National Association of Foremen—Henry W. Lowe, personnel manager, Island Creek Coal Co., Holden; and Moss Browning, mine foreman, Gay Coal & Coke Co., Mt. Gay, where there is also a nationally-affiliated management club. A further indication of national recognition for coal men is the fact that Harrison Maynard, past president of the Island Creek Club and tipple foreman, No. 7 mine, will speak before the next national convention in Philadelphia in September, 1948.

What part do the company and top management play in these clubs? The Island Creek Coal Co. pays the bills for dinner meetings and provides a room for monthly gatherings. The West Virginia Coal & Coke Corp., besides kicking in with a share of the expenses for some of the speakers, has provided a building that will be remodeled for a clubhouse and land for a children's playground, as mentioned earlier. Also, meetings often are held in an assembly room in the company's main office building at Omar, as well as in the local school

auditorium and the women's club building.

As for top management's part, eligibility reaches all the way to the top to include J. D. Francis, president, Island Creek Coal Co., and Charles Dorrance, president, West Virginia Coal & Coke Corp., both of whom are members and often attend meetings. Club offices, however, are held by supervisors far down the line and policy is made at the foreman level, with top management playing hands off unless asked for advice.

Clubs Make Big Gains

Both clubs, at Holden and Omar, have been organized now for more than a year, so that officers as well as company officials can assess their accomplishments and lay plans for the years ahead. Among the accomplishments, these may be listed:

1. Supervisors, brought together in monthly meetings, have made new friends and learned about each other's problems. This new understanding has brought about better cooperation among all departments. For example, to mention only two, the mine foreman and the tipple foreman at one operation discussed their jobs in conversation at a recent meeting, with the result that lumps of coal too large for the tipple now are broken up before they leave the face.

2. The club has provided a new channel of communication up and down, with the result that foremen know more about their company, its needs and plans, and feel that they are an important part of the management team. No longer do shoe-shine boys in nearby Logan learn about a new mine ahead of foremen, because the club has made top company officials conscious of the need for passing information along. In addition, the top brass is no longer isolated from the things foremen know about the men they work with and the conditions they work under.

3. Emphasis on the human element in labor relations—the heart of National Association of Foremen doctrine—has thrown new light on ways to reach higher productivity and promises fewer grievances in the future.

4. Foremen have become better known to top supervisors and company officials. This means more recognition for their abilities and accomplishments and a better chance to move up the ladder.

5. Men who have attended national and regional conventions of

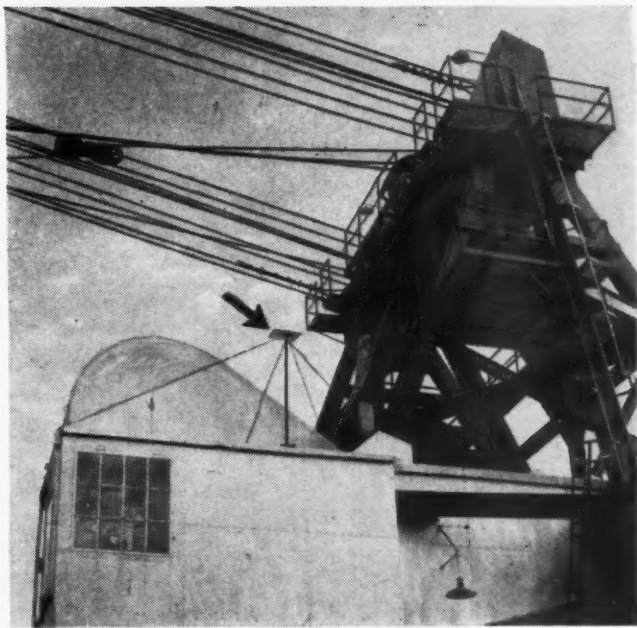
the national organization—tipple foremen, section foremen, superintendents and personnel managers—have rubbed up against the ideas of leaders in other industries and have brought back new ideas to the mine and the tipple. In addition, they have carried the coal industry with them on their travels and have sold it to men in other industries. All this is good for coal men, their industry and their company. Men can trade a good deal of information at a national convention like the one in Los Angeles last September, where 8,000 supervisors registered as delegates.

6. Better information about their own industry and their company has equipped foremen and supervisors, particularly at Holden, to make speeches about coal and participate in panel discussions before civic clubs and other groups, thus boosting coal as an industry and as a fuel.

These are some of the doors opened thus far to foremen by management clubs. The years ahead, too, look good. Human relations will remain a strong point in the program. The fact that local membership is drawn entirely from the coal industry—except in the case of the Huntington club, whose members come from many different types of plants—makes it easier to focus human-relations discussions on coal and the men and machines that produce it. Club policy-makers and program chairmen expect to capitalize on this opportunity. From now on, there will be less talk about human relations on the theoretical level and more weight given to local-level problems.

Building a Close-Knit Team

Men at the mine-foreman level and below will continue to draw the biggest benefits from these clubs, as they have in the past, and also will continue to play the major part in shaping policies and arranging programs. However, more advice and help from top management in planning and direction, together with more active participation by superintendents, general managers and company presidents, naturally will work to make the clubs more representative of over-all management and give foremen a stronger sense of sharing in management's problems and accomplishments. Once this need is met, the result will be an even closer-knit team pledged to "the improvement of its members as industrial executives and the advancement of management."



MINE OFFICE TO DRAGLINE—Receptionist Hallie O'Neil (left) uses hand set in the Sunlight office to take message from runner's station in dragline (right). Arrow points to dragline's antenna.

Radio Phones in Stripping

Land and Mobile F-M Stations at Sunlight and Tecumseh Provide Quick Contact Between Offices, Shovels and Supervisors in Autos—20 Mile Range

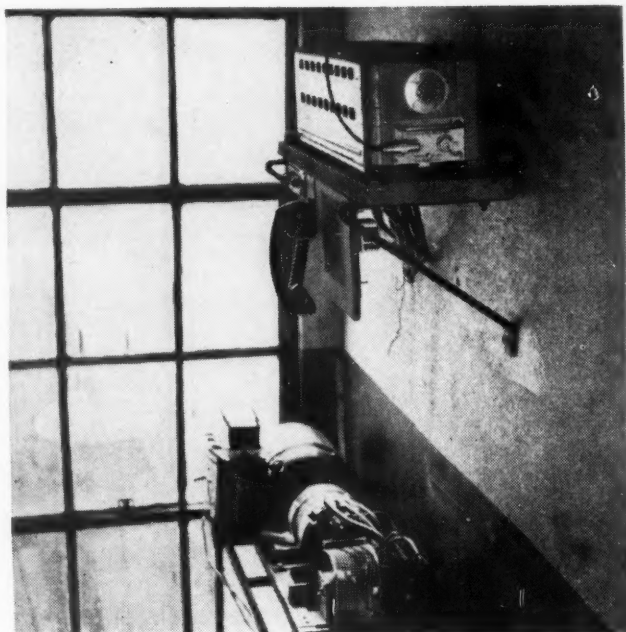
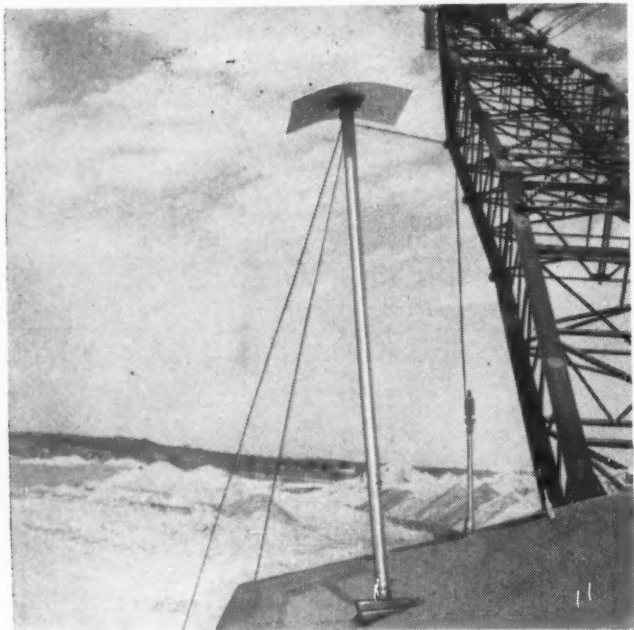
By CHAS. A. OSBORNE, Chief Electrician
Sunlight Coal Co., Tecumseh Coal Corp., Boonville, Ind.

SHORTER WORKING DAYS imposed by present labor contracts are constantly forcing industry to devise new and better methods of maintaining, to the highest degree, a smooth and continuous production schedule. Operating time per shift must be employed to the fullest extent. Management, supervision and maintenance supervisory heads are



AT THE JOB OR IN TRANSIT—Six mobile units help to keep supervisors in touch with one another and the job. Control and hand set are located on the dash (left) while the rest of the equipment is mounted behind the cab of the pick-up (right).

Crossing Spoil Dumps No Problem With F-M Phones



FIELD OR DRAGLINE STATION—The equipment consists of roof antenna (left) and a mobile unit with battery charger (right) mounted in the runner's cab.

finding it increasingly difficult to meet the demands of maintaining such vigorous schedules.

In the coal stripping industry, which by its very nature covers considerable territory, this harried personnel must cover several square miles of operation daily, by driving over the property on regular inspections and job planning. At the same time work is probably piling up on a desk, or some urgent problem is waiting final discussion and solution by officials busily engaged in other parts of the mines. Any disruption of the production cycle must be instantly reported to the proper personnel so that the utmost effort can be exerted toward re-establishing the schedule with a minimum of lost time. Obviously some means must be provided to permit instant communication between all supervisors, wherever they may be, if such exacting demands are to be met.

A most successful step has recently been taken by Sunlight Coal Co. and Tecumseh Coal Corp., an affiliate, which operate two large strip mines in the coal fields of southern Indiana near Boonville. This has been the establishment of a more efficient system of communication between all parts of the two operations and the managing and supervisory personnel.

The key is a modern communication system involving the use of frequency-modulation (F-M) two-way radio units in strategic locations on both mining properties, and

in the cars of managing and maintenance supervisors. This system, as recommended by the General Electric Co., consists of one 50-watt Type ES-3-A standard wall-cabinet land station and 12 15-watt Type ES-1-A mobile units.

50-Watt Unit at Main Office

The 50-watt land station is located at the main office near Boonville, Ind., and has its antenna mounted only 60 ft. above ground level on a standard power pole. Single-phase 120-volt 60-cycle a.c. power for this station is furnished by the regular office lighting system. The service of this station is made available at the desks in the offices of the general manager and superintendent, chief electrician and master mechanic and the receptionist. A loud speaker is mounted overhead in the receptionist's office and can easily be heard by all other office personnel.

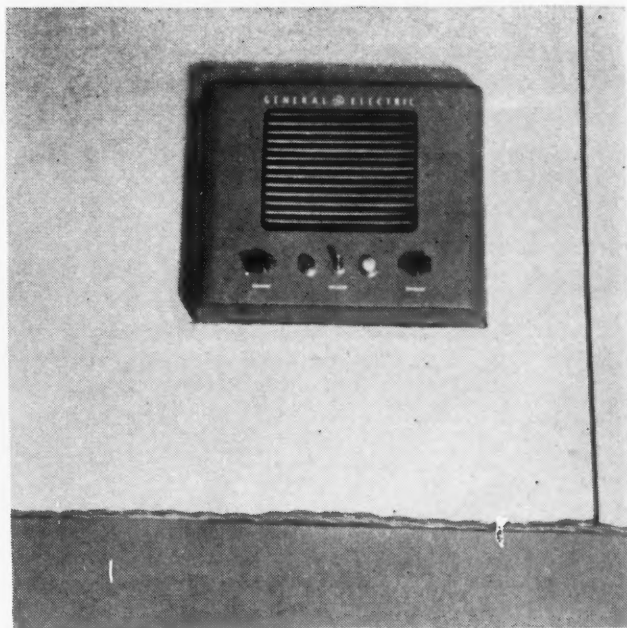
Mobile units are installed in the operator's cab on each of two 40- and one 30-cu.yd. stripping units. These units provide the shovel crews and pit foremen access to both mine offices and cars for essential communication. The units are turned on only when machine crews or pit foremen need to use the radio. This is done to avoid delays that would be caused should the machine operators have to answer any and all calls that may come to his pit.

Power for these units is furnished by a standard 6-volt car bat-

tery kept constantly charged by a small Leece-Neville battery charging system. This system comprises one three-phase alternator with a rectified output and a voltage and current regulator to control the electrical system, all mounted as a unit and driven by a 1½-hp. a.c. motor directly connected to the alternator shaft. If the power supply should be cut off a shovel, the battery will keep the radio in operation several hours.

One mobile unit is installed in the Tecumseh mine office. The regular antenna and control of the mobile unit are used, with the antenna mounted on the roof of the office building some 25 ft. above ground. This provides sufficient working range from this office for the mobile units in the areas covered by this mine. This range is about eight miles to cars depending upon the intervening terrain. Power for the unit is furnished by a 6-volt battery and the charging system identical with the shovel units.

There are six mobile units installed in cars used by the supervisory force. One unit is in the car of the general superintendent in charge of all operations at both mines, one each in the cars of the superintendent of each mine, one in the car of the master mechanic who covers both mines, one in the car of the chief electrician covering both mines and one in the car of the night general foreman of the Sunlight mine. One other unit is being made up for use on remote



LAND OR OFFICE STATION—A 60 ft. pole-mounted antenna (left) and loud speaker (right) mounted above the receptionist's desk are part of the equipment located at the Sunlight office, headquarters for the F-M network.

repair and construction jobs, with a twelfth as a spare.

All the cars are equipped with the Leece-Neville system, replacing the standard car generator system. This battery-charging system provides a constant voltage and a high charging rate from idling to very high engine speeds, and keeps the battery fully charged. There is need for such a system, since the battery drain is well above normal for ordinary car use. The mobile units require 15 amp. for reception and 25 for transmitting which, added to the normal operating electrical demand of the car, comprises quite a load on the battery.

Present and future developments of these mines cover about 200 square miles of territory, with the main office at Boonville centrally located. Thus, the 20-mile working range of the land station will effectively cover all operations and assure adequate contact with all mobile units. Car-to-car contact ranges vary greatly as a result of the hilly nature of the territory over which they operate, and also as a result of driving in the strip pits, which are as much as 50 ft. deep. If contact between such cruising units is lost, messages may be relayed through the land station. Should a greater range become necessary, the antenna of the land station need only be raised to a greater height.

The fact that all units are on the one frequency has proved very advantageous. Discussion can be carried on between any group of super-

visors, though they may be located in many different parts of the two mines. All types of delays in various parts of the mines can be instantly reported to the proper persons, who, in turn, can prescribe the necessary procedure to cut delay time to a minimum, change the stripping plan or shift loading operations from one part of the mine to another as the occasion may demand. Thus, production can be kept moving at a maximum pace.

Supervisors' Time Conserved

All this is easily accomplished by the supervisor involved without his physical presence, and permits him to continue his routine course. At the Sunlight mine, the office, preparation plant, garage and shop, are grouped together. Each of two pits are six miles from the office and also are six miles from one another. The physical arrangement of the Tecumseh mine is very much the same. It is 12 miles away from the Sunlight mine. Loading may take place in either or both pits of each mine.

Locating the superintendent, chief electrician or master mechanic, in case of trouble, was formerly a matter of luck and a couple of hours of valuable time often was lost. Now, they always are as close as the radio hand set in the cars, shovels or office. To further simplify matters, it is the custom of personnel with radio units in their cars to notify the office when they are leaving their car, where they are

and about how long they will be gone. Hence, their whereabouts are known at all times by the office. Numerous problems arise every day that are easily taken care of by the use of the system.

The main feature of the F-M radio system is its dependability in all kinds of weather, and also the fact that it can be used around electrical equipment. Sparking of d.c. motor and generator commutators, even though the radio units are mounted on the shovels, causes no interference in any of the units.

Continuity of service is surprisingly high, even though the units mounted in cars and on shovels are subjected to rough treatment from vibration. Regular inspection by a competent service man, holding a first-class radio-operator's license, keeps these units in first-class operating condition. If a unit does fail, it is readily replaced by the spare unit, which has been pre-tuned—another advantage of the one-frequency system. To change units requires only 5 or 6 minutes. This quick-change feature keeps the cars in service continually.

The advantages gained by this installation have been manifold. Not only has production time been materially increased but the mileage covered by the supervisory personnel has been greatly reduced. The time saved can be devoted to many other jobs, such as planning and conferences. This greatly eases the load of such personnel and at the same time keeps production rolling.

Special Control System Raises Belt Speed During Shuttle-Car Discharge—

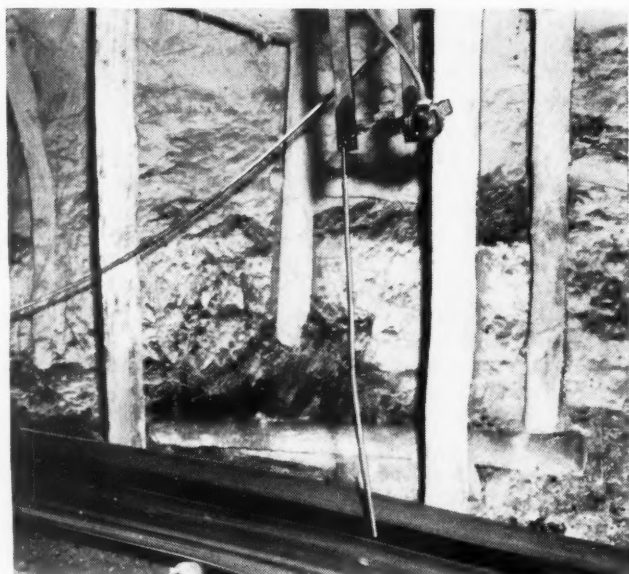


Loads of Rock Are Automatically Spaced Between Loads of Coal — Special Hoppers, Chutes and Protective Switches Developed

1 TO PERMIT RAPID UNLOADING, shuttle-car operator pulls down on rope that doubles speed of section belt until coal is conveyed and discharged to mother belt.



2 LOAD ON THE SECTION BELT approaching the transfer point deflects Finger No. 1, actuating a mercury switch that doubles speed of the mother belt.



3 FINGER NO. 2 is held by M. E. Prunty, superintendent, as it is deflected by coal on the loaded mother belt—in which position speed of the mother belt is doubled and the section belt is stopped until the mother belt is clear. The mercury switch is held in tipped position (right) only when the belt is running empty and the finger is hanging straight down.

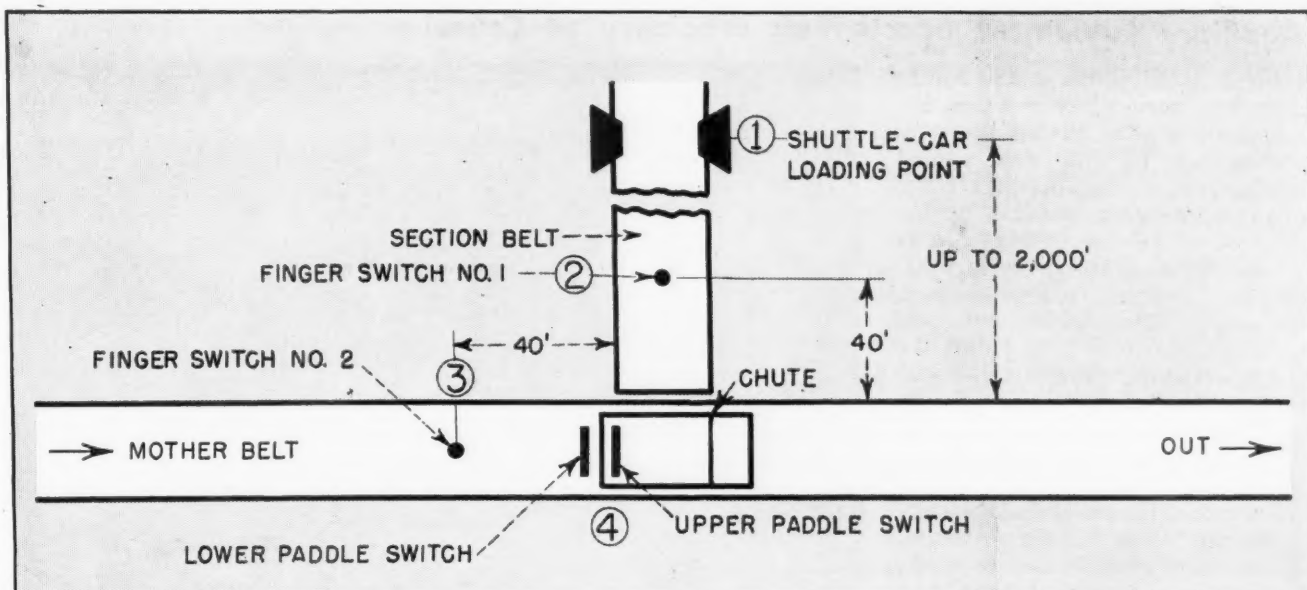


FIG. 1—SECTION-BELT SET-UP for automatic control. Rope pull (1) doubles speed of section belt as shuttle car discharges; finger switches (2 and 3) coordinate transfer of coal with paddle switches (4) stopping both belts if chute clogs up.

Automatic Belt Dispatching

FAST SHUTTLE-CAR discharge directly to 30-in. belts without overloading is facilitated by a special control system at Mine No. 204, Consolidation Coal Co. (Ky.), Jenkins. The system permits the belts to operate at high speed during the time the shuttle car is discharging, and then drops them back to low speed. The controls make use of mercury switches and time-delay relays to accomplish the following:

(1) time the changes in the speed of the mother belt in relation to the section belt; (2) automatically dispatch the belt loads to prevent overloading of the mother belt; and (3) stop the belts if the feed from a section belt becomes choked. Sideboard hoppers and chutes to properly load belts have been improved along with the automatic controls.

Since the belts were first installed in this mine, in July, 1946, the con-

trols have been improved and elaborated from time to time. A belt unit usually consists of two 30-in. Goodman section belts a maximum of 2,000 ft. long discharging to one Goodman 30-in. mother belt 2,400 ft. long. Joy 14BU machines load into Joy 6SC 6-ton shuttle cars with elevating discharge conveyors. In some working places full-seam mining is the practice. A heavy rock parting of varying thickness is present and in some sections it is loaded with the coal for separation at the washing plant. In other sections, this rock is so thick that it must be loaded separately. Therefore, it is deposited on the mother belt only at times when it is carrying no coal past the discharge of that particular section belt.

The motor drives and controllers of the section and mother belts are identical. Each control panel includes a manually adjusted field rheostat, by which the high speed of the automatic control can be adjusted to any belt speed between 210 and 420 f.p.m. Now that most of the bugs have been worked out of the control and protective innovations, the high-speed setting of the belts usually is kept at the 420 f.p.m. maximum.

In advancing an entry the shuttle cars discharge to the end of the belt. In room work, however, they discharge either to the end or to the side of the belt. When the operator



4 CLOGGING OR PILING UP at the transfer point of coal from either the section or mother belts deflects either of the two paddle switches, which stop both belts until the coal can be cleared.

Auxiliary Equipment Boosts Belt Efficiency at Consol

is about to unload his shuttle car, he pulls an overhead rope which immediately doubles the speed of the section belt. He must keep pulling on the rope during the 60 seconds or so that the 6-ton load is being discharged onto the section belt. After a time sufficient to convey and discharge that load to the mother belt, the section belt slows to normal and with it the mother belt, unless the other section belt keeps it going at full speed.

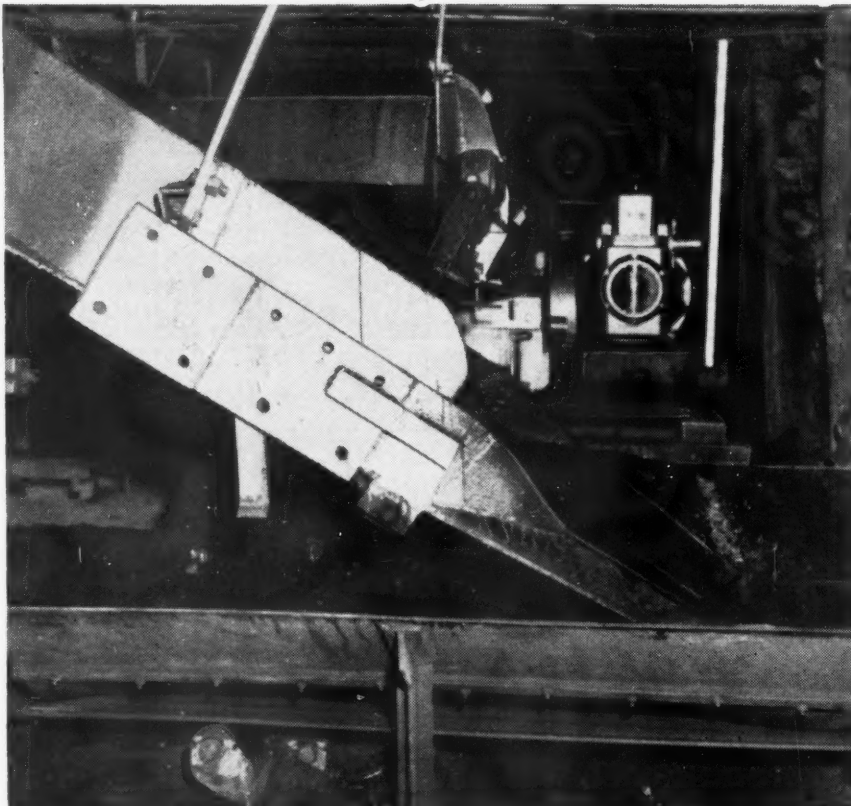
Mercury Switches Utilized

For operating the belt-load indicating and interlocking switches, and also choked-chute stop switches, use is made of mercury tubes tipped by paddles and drag fingers moved by contact with the coal. As shown in Fig. 1, a finger switch (No. 1) is mounted above the section belt 40 ft. inby its discharge, and another (No. 2) is mounted above the mother belt 40 ft. inby the transfer chute.

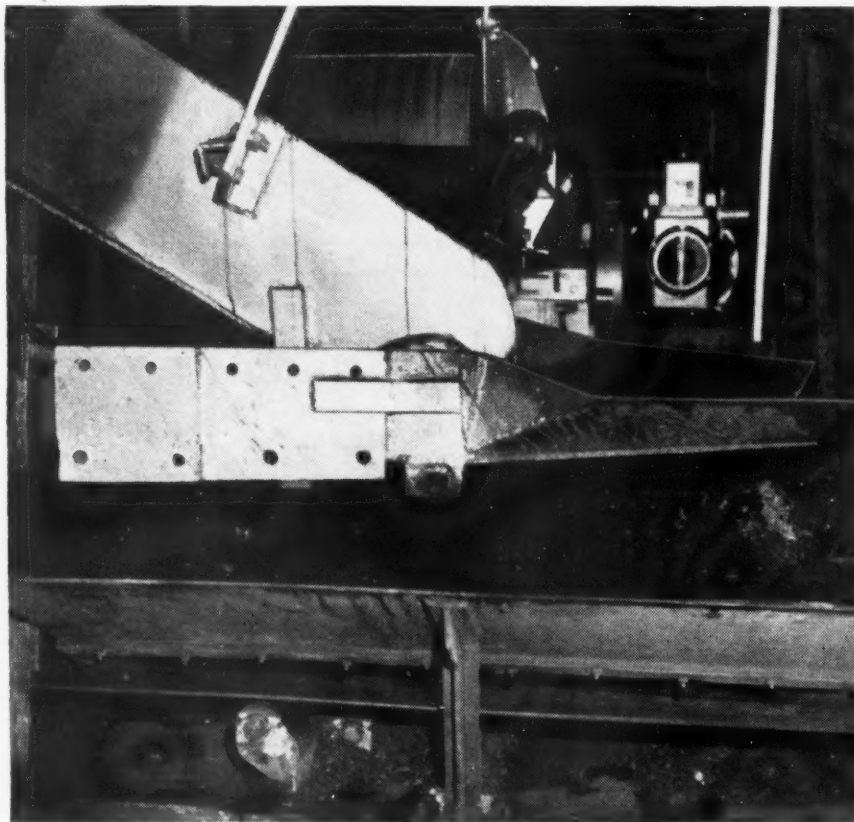
Starting and stopping of the section belt is controlled by Finger Switch No. 2. When the mother belt runs empty at No. 2 switch, the section belt starts at low speed and continues operating until a load of coal from inby on the mother belt reaches No. 2 station. At that point No. 2 switch operates to stop the section belt and, at the same time, increases the speed of the mother belt so that the section belt is stopped a minimum of time.

The speed of the mother belt is raised while the section belt is discharging to it. This automatic control is actuated by Finger Switch No. 1. The distances of the finger switches from the transfer point and the electrical time delays are such that ribbons of coal from individual shuttle cars are spaced 20 to 30 ft. apart. Therefore, shuttle-car loads of mine rock will not overlap coal on the mother belt. The car trimmer at the outby end of the mother belt puts the rock into separate cars.

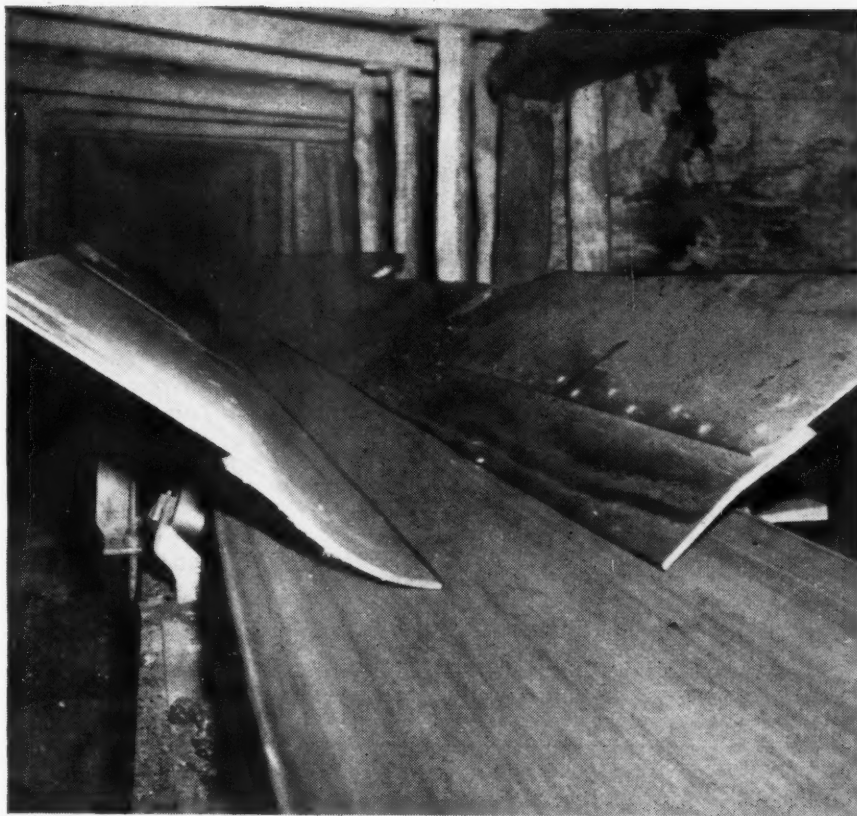
The mechanical connection between the mercury switch and the finger that drags on the coal has been materially improved since the first ones went into use. Continuous bumping of the finger over lumps of coal subjects the switch and its pivot to a lot of wear and tear. Nevertheless the mercury switches held up remarkably well in spite of the continuous shakings. In the improved design illustrated in the photographs, however, the finger and switch are on separate supports and,



HINGED NOSE of transfer chute reduces coal degradation and wear on mother belt. Weight of coal flowing through the chute lowers the chute nose close to the mother belt, thus easing the coal onto it.



WHEN NO COAL is entering the transfer chute from the section belt, a counterbalance on the hinged nose raises it out of the way of the coal moving past the chute on the mother belt.



HOPPER WITH RUBBER PLATES along the bottom and a narrow throat set off center for receiving coal discharged by shuttle cars to the side of the belt was especially developed after considerable experimentation.



A "QUICK-REVERSIBLE" CHAIN FEEDER at the end of the mother belt facilitates discharge to mine cars without delays or spillage. Coal and rock kept apart by the automatic controls are loaded separately.

consequently, the switch is tipped only when there is no coal on the belt. A time-delay relay prevents the circuit being broken when the finger is bumping over the lumps.

An electric-eye arrangement to handle belt-load indication is being tried on one set-up. If it should prove superior in reliability and require less maintenance than the mechanical fingers, all the belt sections will be so equipped.

To stop the belts in case of clogging and piling up of coal at the transfer point, two paddle switches are installed. One is at the top end of the chute and the other, below it, hangs over the mother belt just high enough so that the largest lumps do not touch it when the belt is normally loaded. A pile-up swings one or both the paddles and stops the belts.

Side-Loading Hopper Developed

Where shuttle cars side-load onto the belt, considerable experimentation was necessary to determine that 10 in. is the best width at the bottom, or throat, of the hopper side boards, and also that this throat should be slightly off center to compensate for the tendency of the shuttle-car conveyor to load the far side of the belt heavier than the near side. Armorite rubber strips, which cannot tear a belt, are used for the hopper's bottom sections.

For use at transfer points, a chute was developed with a hinged nose with counterbalance. The counterbalance causes it to rise, thus eliminating dragging. When the mother unit is running empty and the section belt starts discharging, the weight of the coal lowers the chute nose close to the carrying surface of the belt, thus easing the coal onto it.

Mine-car changes without delays and without spillage at the discharge end of the mother belt are accomplished with the Goodman "Yo-yo." This consists of a short horizontal chain feeder that is "quick-reversible" by operation of a clutch lever within easy reach of the car trimmer.

Although it took but a short time after installation to get the belts in Mine No. 204 producing at a healthy rate, officials have continued to improve the controls and methods. At the time this article was written they were equipping one section with everything that has been suggested and proved as an aid to production. Other sections will then be brought to the same standard.

Suspension Roof Support Design and Installation

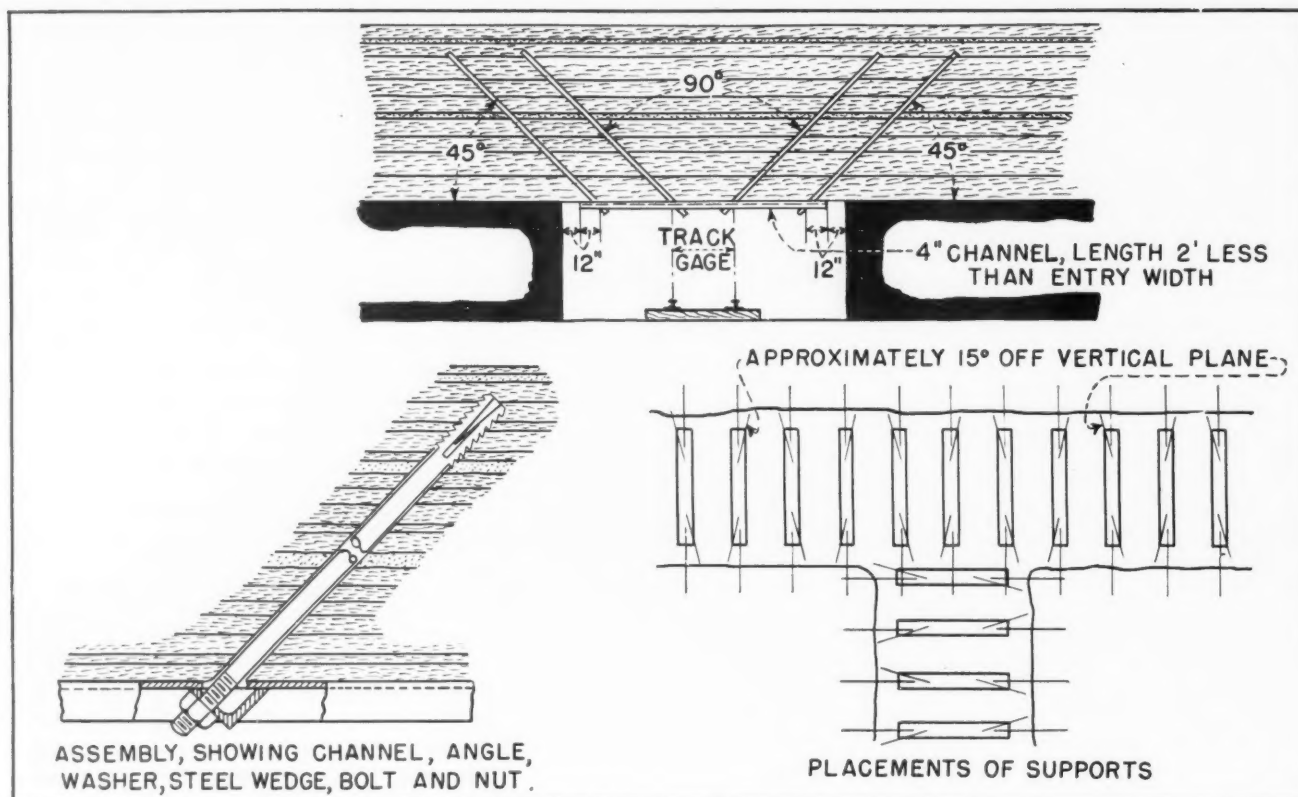


FIG. 1.—EXPERIMENTAL ADAPTATION of suspension supports to a coal-mine roadway.

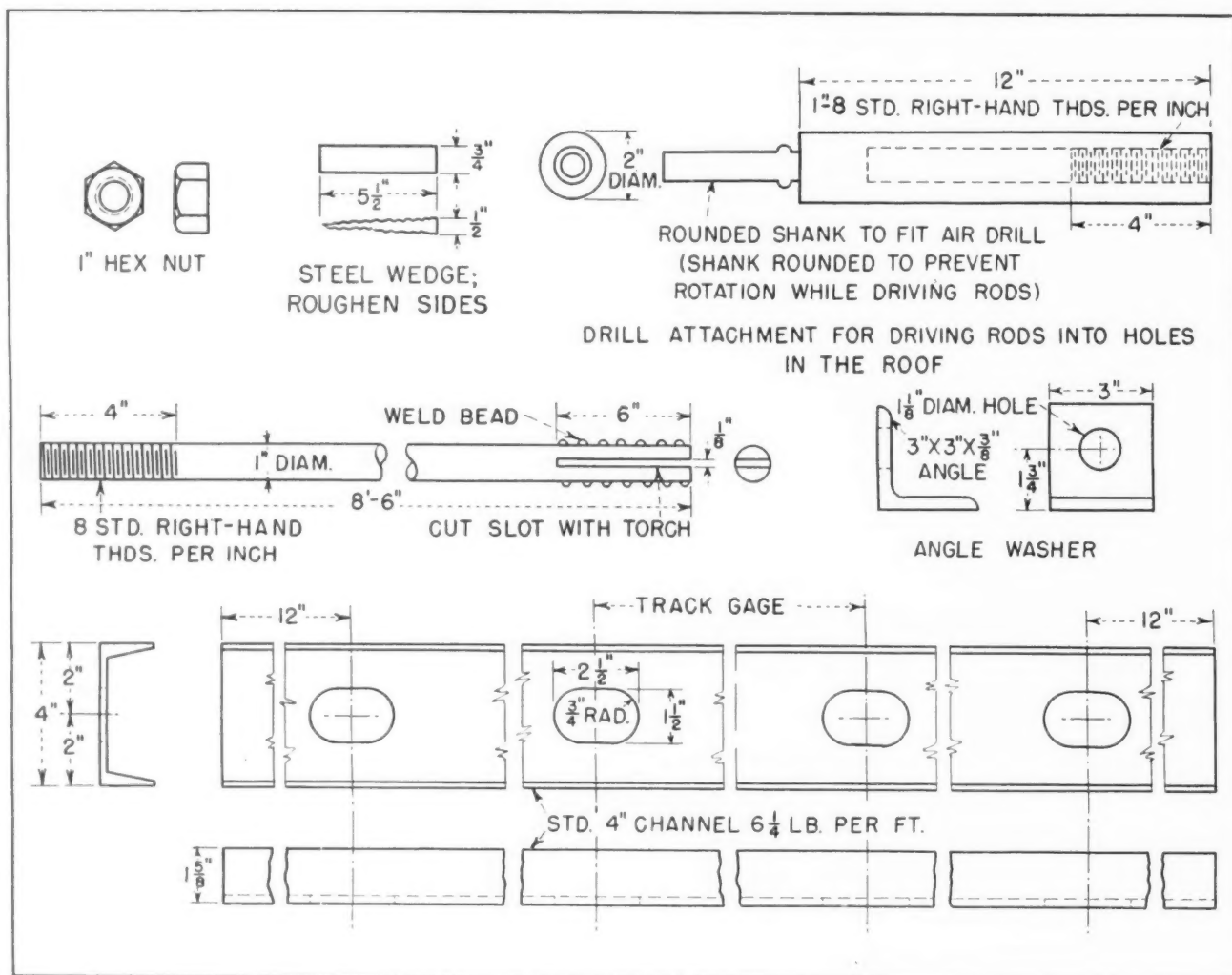


FIG. 2.—DETAILS of experimental adaptation of suspension supports.



SUSPENSION-TYPE ROOF SUPPORTS installed on an experimental basis.

Suspension Roof Support

**Most Promising Means of Meeting the Tests of an Ideal Roof Support Seen in the Suspension Type, Consisting of Channels Bolted to Rods Anchored in Roof Holes—
Factors to Be Considered in Their Use in Mines**

By EDWARD THOMAS

Mining Engineer, U. S. Bureau of Mines, College Park, Md.

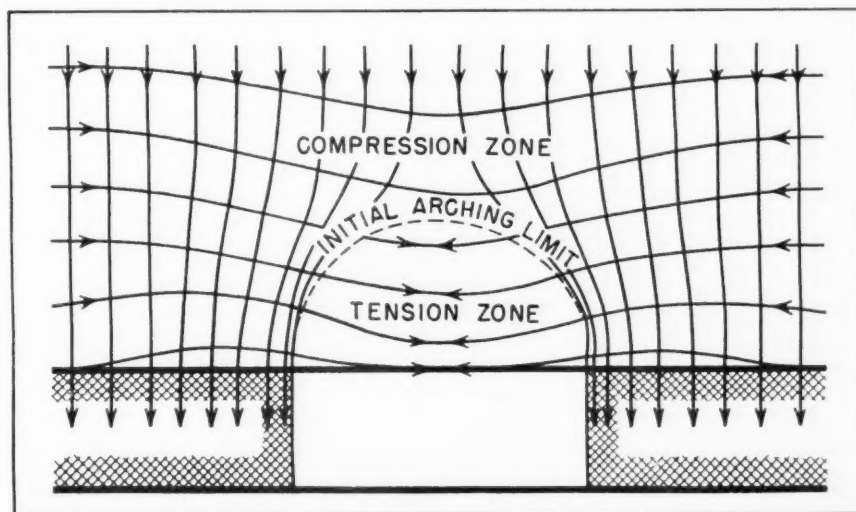


FIG. 3—APPROXIMATE DISTRIBUTION OF ROOF STRESSES above an untimbered opening.

MECHANICAL OPERATION has introduced new hazards into coal mines. At the same time, it also has focused attention on an outstanding factor in safe mine operation—the necessity for maintaining adequate roof support in face areas regardless of the appearance or sound of the roof. With rapidly advancing faces, noisy equipment and pressure for production, a timbering scheme that depends upon the judgment of face workers as to whether the roof needs support is even more precarious than with hand-loading. Most roof rocks are shales, and they are not of uniform strength or consistency. Therefore, it is virtually impossible for anyone to predict accurately whether the roof rock hidden beyond the face will or will not require support.

Safety Posts Not Adequate

In many former hand-loading mines the ordinary safety post provided effective face protection. However, after mechanical-loading equipment was installed, it was found that safety posts often interfered with the operation of mining and loading machines, while the

roof-fall hazard was increased because of frequent accidental dislodgement of safety posts. In many instances, this has resulted in either elimination of the safety post without the substitution of a satisfactory alternative, or the use of safety posts only when an official is making an inspection. Consequently, the more progressive mining companies are continually searching for improved face supports that will provide maximum protection and at the same time interfere as little as possible with the preparation and loading cycles.

Roof-Support Requirements

An ideal roof support should have the following characteristics:

1. It should afford unfailing protection for mining and loading-machine operators and others whose duties require them to be near the faces.
2. It should be structurally stable; that is, the construction should be such that it will not present a hazard through being accidentally dislodged by moving equipment.
3. It should be constructed so that loading equipment can "clean up" each cut without shifting the roof supports or employing a hand shoveler between the mechanical equipment and the face.
4. Its installation should be accomplished quickly and effectively.
5. It should not require replacement during the life of the opening.
6. Its cost should not be excessive.

A number of supports that satisfy some of the above conditions have been developed during the past several years. However, one that promises to satisfy all is the suspension-type roof support. This type of support was developed during the past 20 years in thinly bedded dolomitic deposits in the mines of the St. Joseph Lead Co. in southeastern Missouri (May, 1943, *Engineering and Mining Journal*, pp. 70-72). The basic principle has been applied to counteract "cutters," or unpredictable caving of shale roofs, in a few bituminous coal mines, particularly in the Scott's Run region of northern West Virginia and the Wilmore Basin of central Pennsylvania. It now appears that the supports will have wider application in coal mining than was at first anticipated, and several mining

companies are installing them on an experimental basis.

The principle is to reinforce roof strata by means of steel rods anchored at points where the roof rock will be least affected by stresses set up through mining operations. Considering a bed of coal to be uniformly loaded by the pressure of the overlying strata (approximately 1 lb. per square inch for each foot of depth) an approximate graphic analysis of the stresses acting in the roof rock above a mine opening is shown in Fig. 30. If the pillars on each side of the roadway are of ample size to withstand the added load, a roughly semicircular arch is formed, as shown by the broken line. Outside the arch line the stresses are predominantly in compression; inside, predominantly in tension. Inasmuch as rocks ordinarily have several times as much strength in compression as in tension, only the material within the arch will require immediate support if it is not self-sustaining.

In bedded strata without cementation between the beds, or if the cementing material has been altered, each stratum within the arch line acts as an individual beam. Before a beam fails it must sag along its long axis. The maximum sag will be at or near the middle of the span, even though failure may occur at the ribs. The extent of sag depends upon the modulus of elasticity and the length and depth of the beam. If enough strength is distributed over the entire length of the beam to prevent the sag that occurs before failure, no concern need be felt about the vertical load.

Suspension-Type Installations

Suspension-type roof-support installations being made at the present time include that illustrated in Figs. 1 and 2.

Holes $1\frac{1}{8}$ in. in diameter are drilled $7\frac{1}{2}$ ft. into the roof at an angle of 45 deg. Rods 1 in. in diameter, slotted at the back and threaded at the collar, are driven onto a wedge at the back of the hole with a pneumatic hammer. A 4-in. standard channel section with 1 ft. of clearance on each side of the roadway provides lateral support and rigidity to the four rods shown in Figs. 1 and 2.

With mine track in the center of the roadway, the two middle rods are directly over the rails (it is believed that the hazard from protruding bolt ends will be at a minimum in this position), and the two outside rods are placed fairly close to

the ribs to insure maximum support in the solid rock directly above the pillars. The accompanying photographic illustration shows an experimental installation of such supports in a coal mine. The proper spacing of these supports will be based upon experience. In the experimental installations, the spacing formerly used for crossbars is being followed on a tentative basis.

Factors to Be Considered

The following important factors should be considered before experimenting with or adopting this method of roof support:

1. By using carbide alloy bits the holes may be drilled by electric rotary drills. However, experience in southeastern Missouri shows that the rods cannot be secured properly unless a percussion tool is used to drive a rod against the wedge at the back of a hole. For this reason, in its present state of development, it is difficult to fit the system into a fast-moving cycle of operation, inasmuch as most coal mines are not equipped to use compressed air-driven equipment efficiently.
2. For maximum effectiveness, the sets should be installed as close to advancing faces as possible so that adequate support is applied before sag occurs in the strata. It is not recommended that these supports be used for retimbering areas where other supports have failed.
3. The holes should be made with a "stopper" drill. In shales, an 8-ft. "up" hole can be drilled in from 5 to 10 minutes. Considerable time can also be saved if a power-driven impact wrench is used to tighten the nuts rather than a hand wrench.

In modern mechanized mines, working faces advance too fast to depend upon the judgment of individuals as to whether the roof is sound. In too many instances roof that appeared to be safe and self-supporting when inspected became dangerous when the face advanced a few feet, and workers at the face, intent upon the production of coal, were not aware of a developing hazard until someone was injured or killed. The fullest possibilities of mine mechanization cannot be achieved without the development of improved types of roof supports that give positive support without interfering with the efficient operation of equipment. Suspension-type supports promise to meet this need.

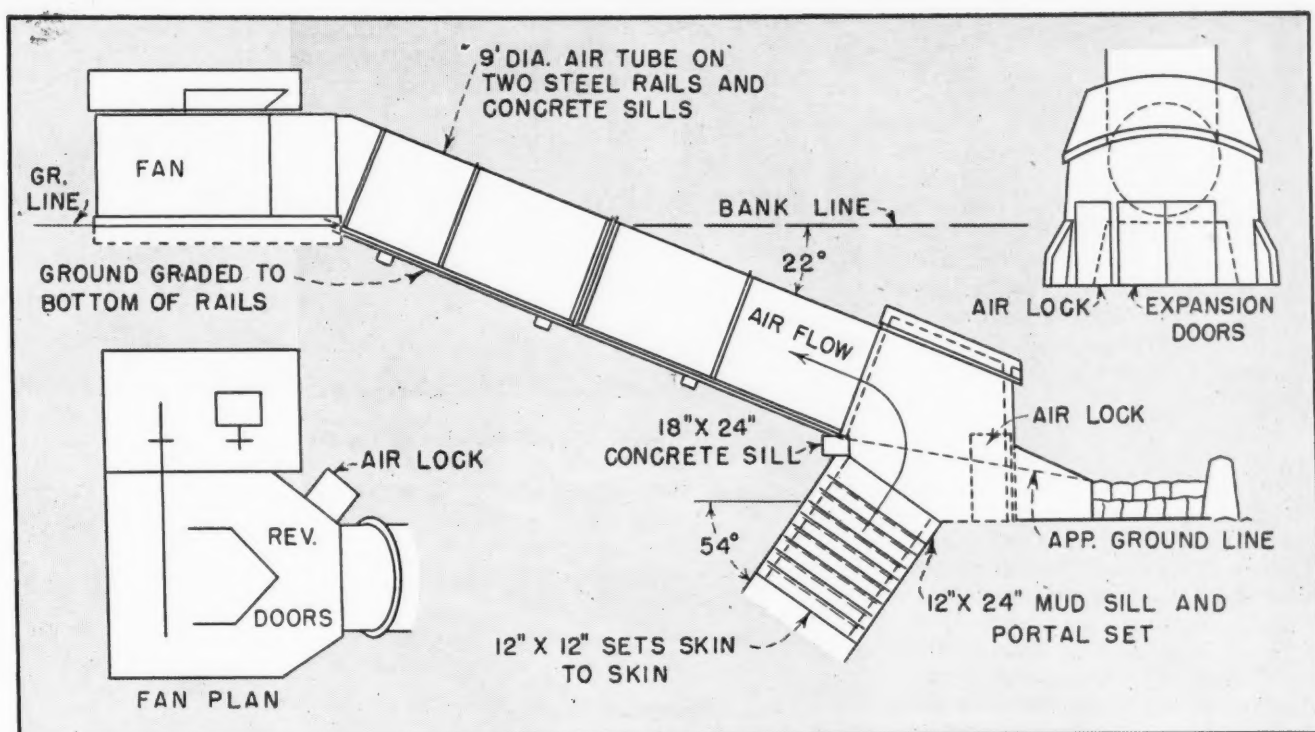


FIG. 1—FAN LAYOUT and connection to new air slope 335 ft. long and inclined 54 deg. from the horizontal. Easy access to the fan and equipment in case of necessity is a major feature of this installation.

Fan Change Helps Ventilation

Air Volume Nearly Doubled With No Increase in Horsepower or Water Gage by Moving Fan to New and Larger Opening—Steel Tube Connects Fan to New Slope—Fireproof Housing Supplemented by Audible Warning

By WARREN E. CRANE
Seattle, Wash.

NEARLY DOUBLE the air volume and a substantial improvement in the ventilation situation followed making of a new air slope and relocation and rebuilding of the original fan installation by Bellingham Coal Mines, Bellingham, Wash. The additional air was obtained with no increase in water gage or horsepower.

The Bellingham operation is in Whatcom County, Washington, where coal was first discovered in



WELL-KEPT SURFACE PLANT in keeping with its location near a charming residential district characterizes the Bellingham operation.

1852. Although a poor grade of lignite had been found in the Cowlitz Valley four years previously, the first mine in the state was opened in the Bellingham seam in what is now the City of Bellingham. At present, Mine No. 1 of Bellingham Coal Mines is the largest operating coal mine in the country. Its opening resulted from investigation begun in 1917 to develop coal production to offset the acute shortage of oil for the operation of the Superior-Portland Cement Co., Inc., at Concrete, Wash.

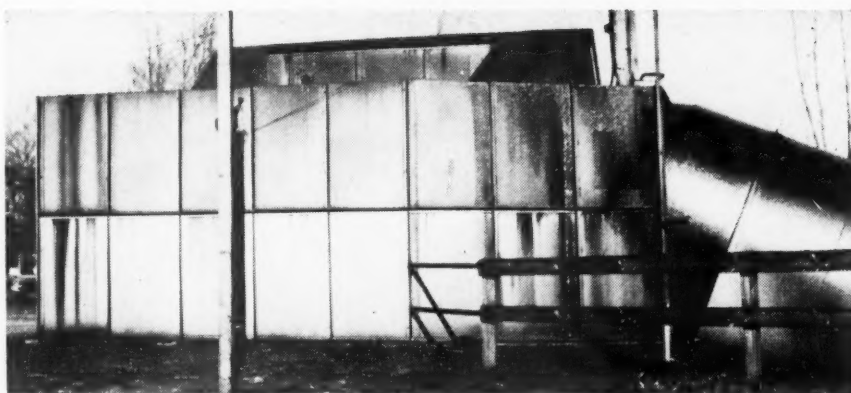
After several tests of various fields, the Bellingham area was selected as the most promising and Bellingham Coal Mines was organized. Actual operation began in September, 1918, and has continued with few interruptions since that time. In the eleven years ended Feb. 1, 1948, according to Harry Merbach, general sales manager, production totaled 2,146,000 tons. Because of manpower shortage, output dropped during World War II. Since then, however, the working force has increased to an average of 170 men, with a corresponding rise in output. Mining now is being carried on at a depth of 1,200 ft. below sea level.

Surface Facilities Attractive

The Bellingham operation is unlike the usual mine in that it is adjacent to a charming residential section of the City of Bellingham. The operation has been beautified and built up into an attractive place with sweeping velvet-green lawns and flower gardens. The entrance to the property is an arch 25 ft. high upon which is placed a loaded coal car, flanked on each side by a container in which a shrub is growing to typify the beauty of the place. The office and mine buildings are neat and well kept. This also is true of the storehouse, the modern wash-house with showers, the tippie and the up-to-date machine shop.

The managerial keynote is set forth in the slogan painted on a large neat sign hanging under the welcoming arch, which reads: "Bellingham Coal Mines, The Home of More Heat per Dollar."

On Oct. 9, 1919, shortly after the property was opened, the company purchased a Western Blower Co. No. 9-turbine, double-width double-inlet fan complete with reversing mechanism, No. 10-gage black-sheet housing and airlock for access to the fan interior. The unit was a



U.S. Bureau of Mines

FIREPROOF CONSTRUCTION characterizes the new fan installation.



A STEEL TUBE connects the fan with the new airslope. The double explosion doors in the concrete penstock have lead wings to permit them to open in case of an explosion.

forerunner of the present-day turbine multiblade fan with forward-curved blades. Mean Diameter of the double wheel is 54 in. Outlet area is 1,782 sq. ft. The fan was put in service Feb. 13, 1920, and has been used continuously since that time.

Officials of the company, including J. H. Pascoe, general superintendent, recently concluded that the original shaft, 265 ft. deep, was not large enough to furnish the necessary air, although the fan was functioning in excellent fashion after nearly three decades of service. The seams dip heavily and slope is now 6,700 ft. long from portal to lowest level and still sinking.

Because of the small size of the original airshaft, the mine was being furnished with only 50,000 to 52,000 c.f.m., which was considered

inadequate. Consequently, it was decided to sink a new air slope 9x8 ft. in the clear on the side of the hill 300 ft. away from the original location. As shown in Fig. 1, inclination of this slope is 54 deg. from the horizontal. The length of the slope to the coal is 335 ft. Two layers of quicksand 15 and 25 ft. and 40 ft. apart were encountered in sinking and, consequently, the slope was timbered with 12x12-in. sets skin-to-skin for a depth of 315 ft.

The fan was moved from its original foundation July 5, 1946, and was in place on its new concrete foundation in a fireproof housing July 6, some 36 hours later. The new fan house was erected on the hillside 58 ft. distant from the new slope. The connection to the concrete penstock over the slope is a steel tube 9 ft. in diameter on an inclination

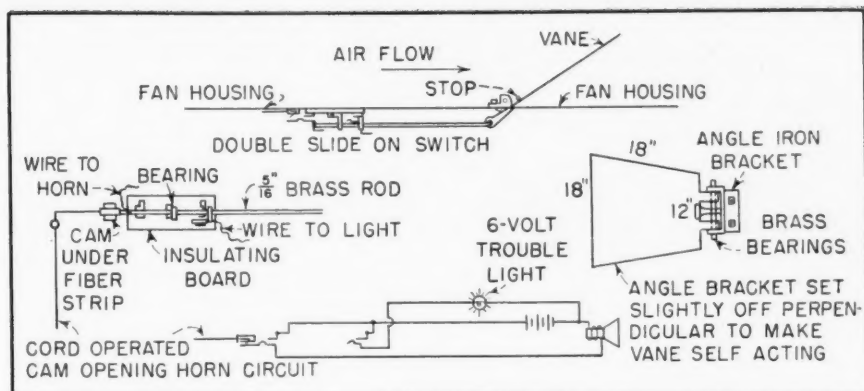


FIG. 2—AUTOMATIC WARNING SYSTEM on the Bellingham fan.

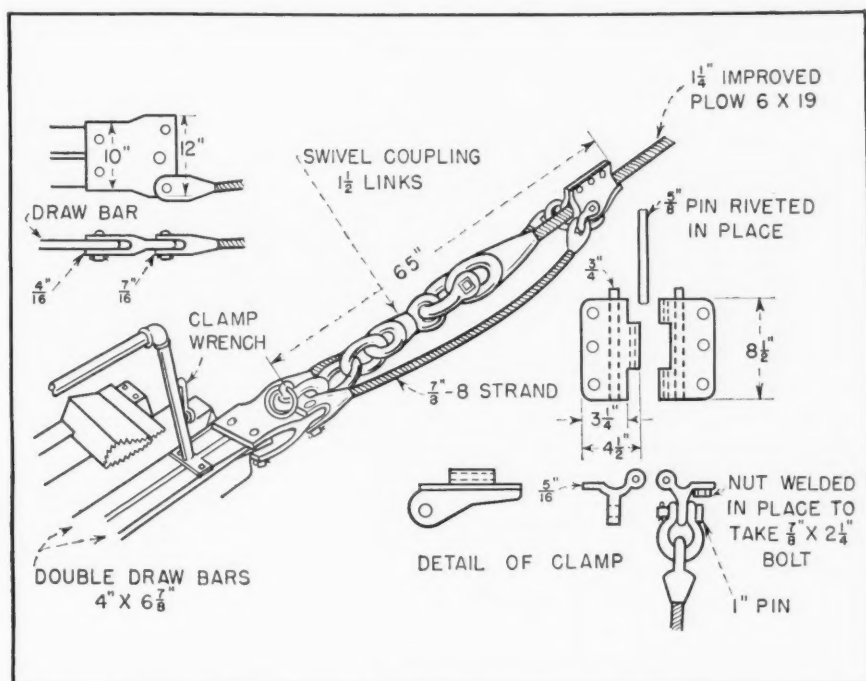


FIG. 3—MAN TRIP safety clamp and coupling developed at Bellingham mines as an important additional safety factor in handling men.

of 22 deg. (Fig. 1). The tube provides an area of 63.6 sq.ft., slightly smaller than the slope area of 72 sq.ft. A major advantage of the new arrangement is the easy access to fan and equipment it provides in case of an emergency.

It is estimated that the new installation makes it possible for the fan to deliver 80,000 c.f.m. against a 3 1/2-in. water gage at 427 r.p.m., thereby exceeding the stringent requirements of the Washington State mining law. Air volume has been nearly doubled with the same horsepower and water gage.

The fan is driven by a 100-hp. motor and, as noted, is housed in a fireproof building. General Electric starting equipment is provided and, in addition to the usual V-type gage, is provided with a recording water gage. Fafnir roller bearings are

used throughout the entire fan unit.

Over-all height of the fan house is 12 ft.; main fan housing, 8 ft. 4 in.; width, not including the airlock, 15 ft.; length, 19 ft. Presently operating exhausting, the fan is supplemented by a evasee-chimney reversing door, two reversing doors at the rear and two doors within the housing that open or close when the air flow is changed from exhausting or blowing, or vice versa. A horizontal discharge at the bottom contributes to high efficiency. The wheel housings are securely braced with 2x2x1/4-in. angles for long life and freedom from excessive vibration. The inlet and outlet sides of the unit are fitted with angle frames for duct connections.

The new installation is equipped with explosion doors in front of the concrete penstock over the slope, as

shown in the accompanying illustrations. These twin steel doors have been provided with soft lead wings in small sockets. If an explosion should occur, the pressure of the blast would shear the lead wings and open the doors, thus protecting the main fan installation itself.

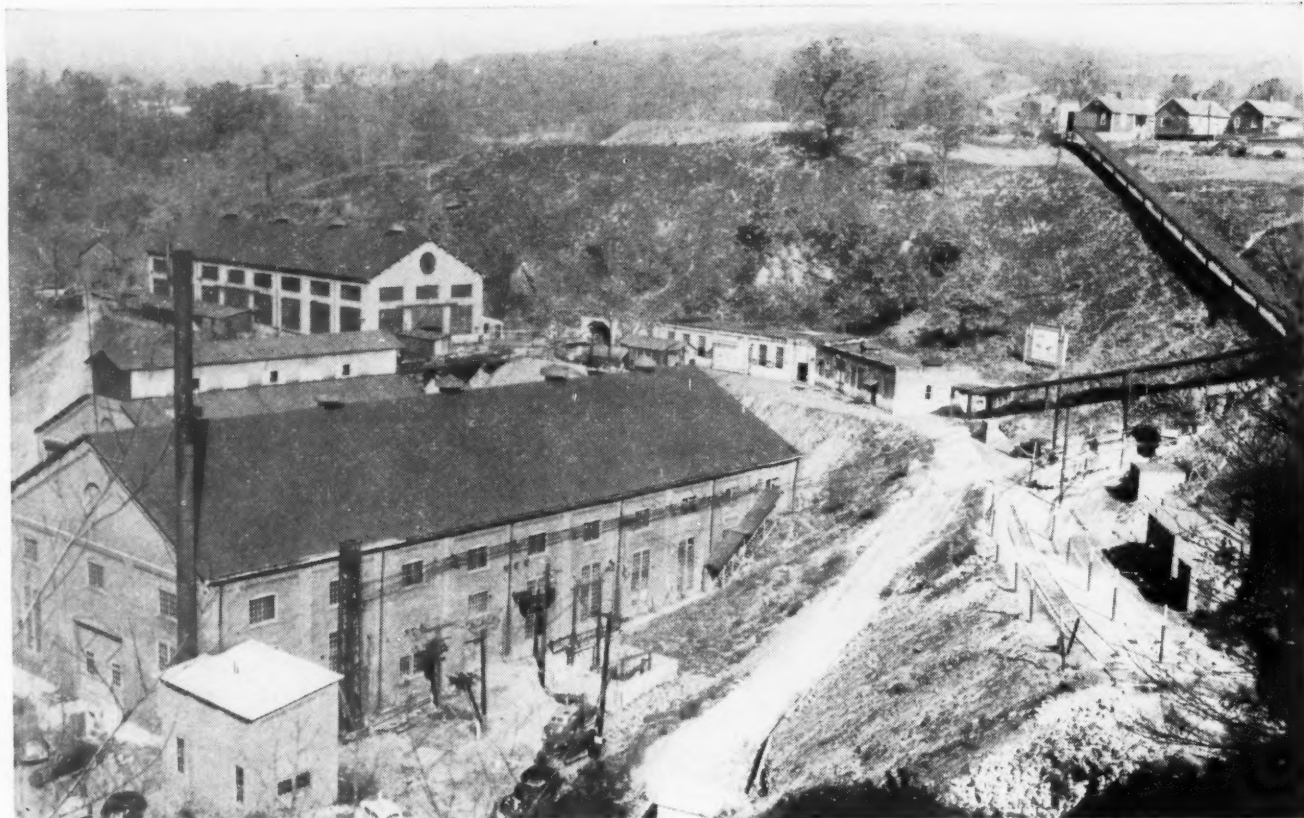
A major feature of the installation is an automatic warning signal designed by Hugh Hendrix, chief electrician. As shown in Fig. 2, it consists of vane about 18x18x12 in. hung on the wall in the fan casing. Whenever the air flow slows down or stops, the blade drops back and closes a double-contact switch. A siren in the circuit is started up as a signal that the fan has stopped or is not functioning properly, whereupon the men are promptly brought out of the mine. Power for the siren circuit is provided by an automobile battery.

Safety Precautions Stressed

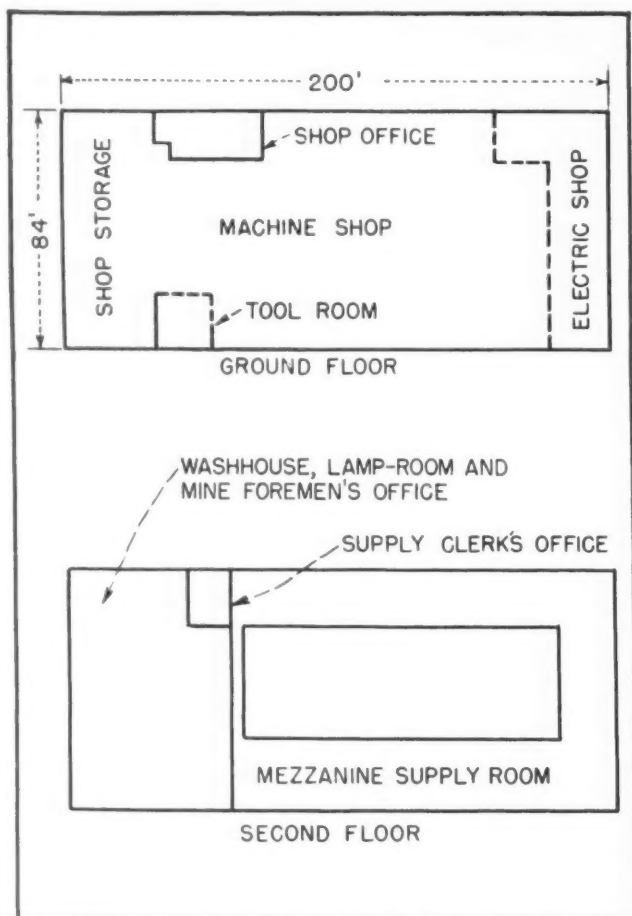
Water is piped into all working places to allay coal dust. Fog guns (November, 1947, *Coal Age*, p. 93) also are provided in all working places to control dust and fumes during blasting operations. As an added precaution to prevent accidents, the mine is thoroughly rock-dusted throughout. Carrying open lights or matches in the mine is prohibited. All men wear permissible electric cap lamps, as well as safety hats and shoes. Compressed-air drills are used for drilling all shot-holes prior to blasting.

The many other safety features at the mine include a safety hitch for the hoist rope. As shown in Fig. 3, it consists of a clamp and auxiliary ropes to supplement the main hitching. Designed by Mr. Pascoe, the hitching includes two 7/8-in. ropes terminating at one end in a clamp around the main 1 1/4-in. hoist rope above the socket and at the other end in a clevis fitting over the double drawbar on the mantrip car. This device helps to break a possible load strain of 57 tons and furnishes an important safety factor when men are being raised or lowered to and from the mine. The addition of extra couplings between each car has also insured greater safety in haulage operations.

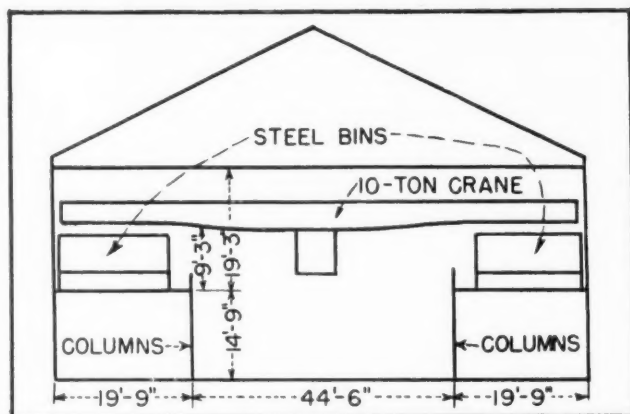
As a result of all the various safety measures in the mine, the company has not had a fatal accident for eleven years and has averaged only two or three minor accidents a month.



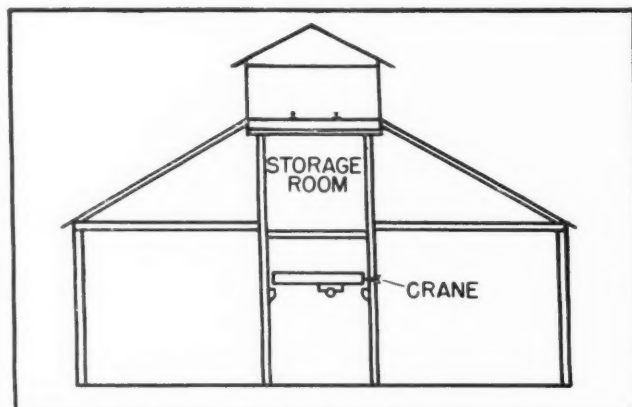
NEW CENTRAL MACHINE SHOP includes the large building, 84x200 ft., and back of it the forge and welding shop. The white building farther back is being made into a locomotive shop. A ski tow for miners is in the gallery angling up the hill.



HOW MAIN BUILDING WAS REMODELED is shown in these floor plans. Broken lines indicate wire-mesh partitions.



A 10-TON CRANE was installed to serve the main bay of the machine shop.



MOTOR TRUCKS CAN DRIVE INTO the elevated storage room of the forge and welding shop, originally a coal bunker.



MAIN BAY OF THE SHOP located in the large building is served by an electric crane spanning the width of the building and running above the steel cabinets of the mezzanine supply room.

Shop Modernization at Vesta

New Facilities for Maintenance of Vesta-Shannopin Coal Division Equipment Centered at Vesta No. 5, Where 20,000-Ton Plant Is Being Built—Elevator With 35-Ft. Platform Handles 30-Ton Locomotives

By J. H. EDWARDS
Associate Editor, Coal Age

FIRST TO BE COMPLETED among several reconstruction projects planned and under way in the Vesta-Shannopin Coal Division of the Jones & Laughlin Steel Corp. was a general machine shop at the man portal at Vesta No. 5 mine, near Brownsville, Pa. This spacious and convenient shop has every modern facility to adequately and economically maintain the mining equipment, which now produces 19,000 tons of coal per day and which, after completion of a change to full-seam mining now underway, will handle approximately 27,000 tons of material per day.

Fortunately, there were available

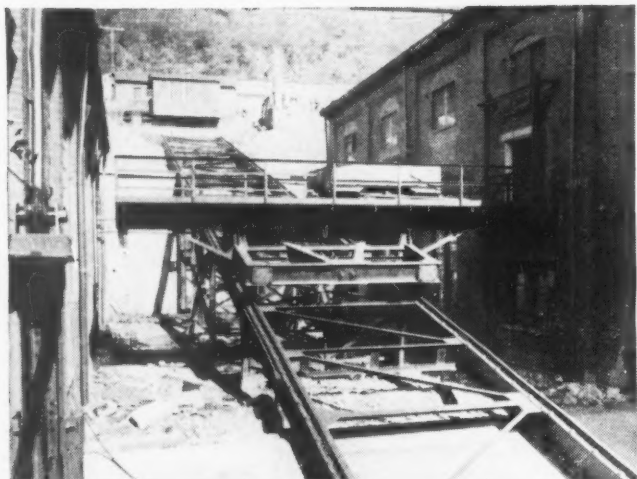
for housing this general shop project two large brick buildings which formerly served as boiler and engine houses for a power plant that supplied Vesta No. 5 mine. An obstacle to be overcome was the fact that the ground-floor elevation of these buildings is 40 ft. below that of the mine tracks on the adjacent hillside. This was overcome by installing an inclined elevator with a platform 35 ft. long, which will accommodate the largest items of mobile equipment, these being 30-ton three-truck locomotives. Bumper pistons backed up by compressed air automatically ease the elevator car and heavy loads to a stop at the bottom landing.

The old engine house is 84x200 ft. and its height is 38 ft. from the ground floor to the underside of the roof trusses. A mezzanine floor 19 ft. wide was installed across the end farthest from the hill and 140 ft. along the two sides, which space is used as a central supply house and for the offices of the supply clerk.

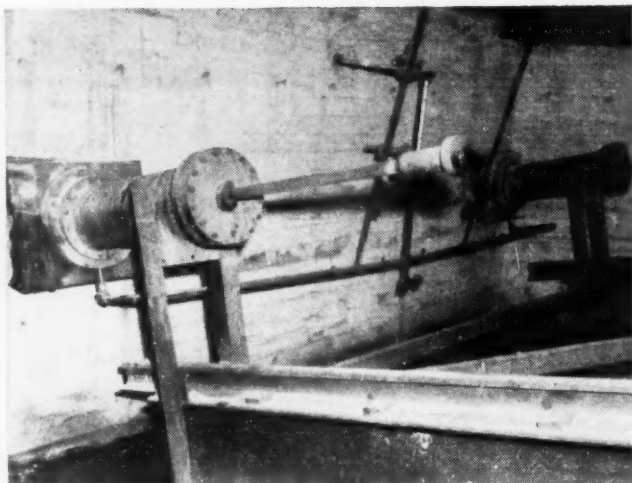
The inclined elevator, which travels 186 ft. on a slope of 13 deg. 37 min. (24.21 percent), has a landing at the mezzanine floor where two mine cars coupled together can be run from the elevator platform into the mezzanine for loading with mine supplies or for bringing in parts or tools for repair or sharpening. Inclined track gage is 14 ft. and the elevator is operated by a 75-hp. wound-rotor motor with contact controls providing dynamic braking.

Gates at the three landings are interlocked with the pushbutton controls so that the elevator is inoperative while any gate is open. The two air cylinders of the bottom-landing bumpers are kept charged with compressed air through a reducing valve. A pop valve gradually releases the air from the cylinders after the

Special Equipment Eases Work at Vesta Shop



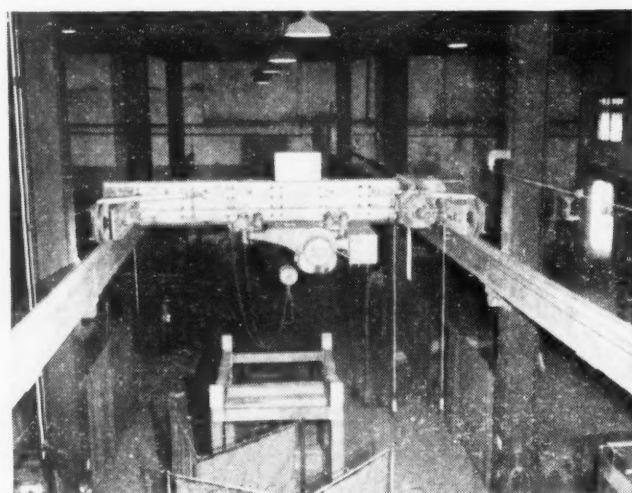
THE INCLINED ELEVATOR has brought an empty car down from the portal tracks to be pushed into the mezzanine supply room.



BUMPERS STOPPING AND BLOCKING the elevator car at the bottom of the incline are on pistons in compressed-air cylinders.



THE FORGE AND WELDING SHOP are at the left; machine shop and supply house at the right.



FORGE AND WELDING SHOP. Overhead is the floor of a storage room—formerly a coal bunker.

descending elevator car strikes the piston-mounted bumpers. Matching of mine track rails at the door of the machine shop and, at the same time, at the shop-yard level, takes place when the pistons are forced to the back ends of the cylinders.

Highway motor trucks, as well as track-mounted mining machinery and mine cars, can be transferred from one landing to another. The trucks also can be run onto the mezzanine supply-room floor.

The travelway of the elevator car or platform takes up 35 ft. of the 40-ft. space between the two buildings. The old boiler house, which has been made into a forge and welding shop, is 76x108 ft. Height from the floor to the underside of the roof trusses is 24 ft. A bridge crane with a 5-ton electric hoist has been installed on a runway of elevated rails lengthwise of the building and between the columns supporting the former elevated coal bunker, to serve the center floor space where welds are made for the repair or

assembly of large and heavy equipment.

The elevated coal bunker, which has a flat steel floor, is utilized for storage of heavy repair parts and supply items for which there are few calls. Motor trucks can be driven into this coal bunker space by way of a trestle connecting with a road on the adjacent hillside.

Concrete Roof Construction

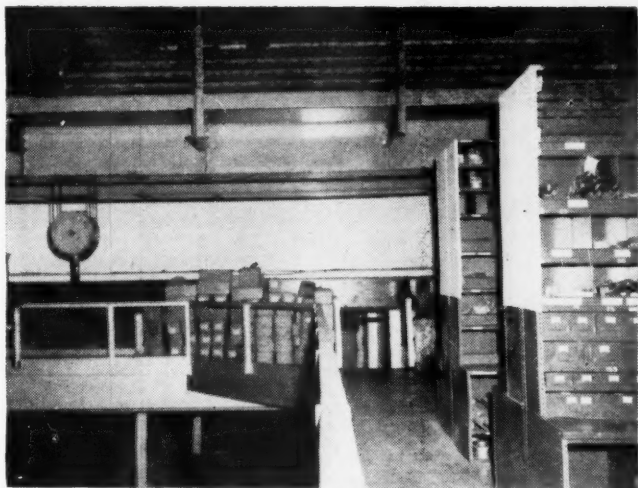
Both buildings have steel roof trusses, steel purlins and reinforced-concrete roofs coated with asphalt. Remodeling of the larger building included construction of a second floor 60x84 ft. beyond the mezzanine at the end adjacent to the hillside. A washhouse, lamproom and mine foremen's office occupy that space.

To serve the center bay of the machine shop, a new 10-ton Cleveland bridge crane with an 82-ft. span was installed. It includes an operator's cab and complete electric drive consisting of 550-volt d.c.

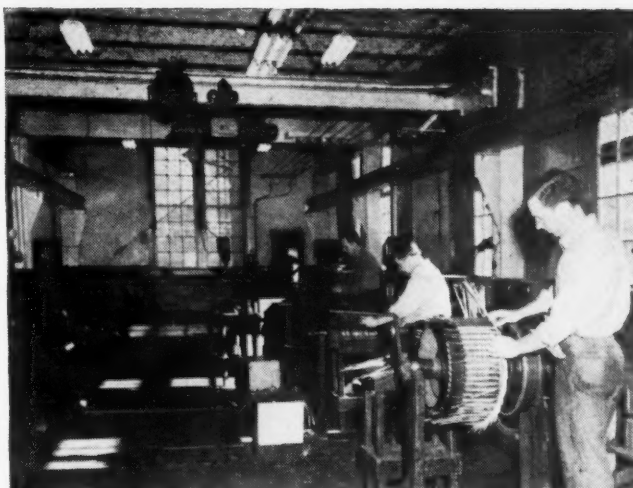
motors with magnetic controls and dynamic braking. Although this crane travels above the walkways and above the steel bins of the supply department on the mezzanine floor, it seldom is used for handling supplies. The girders of the bridge crane clear the tops of the 9-ft. 3-in. steel bins by only a few inches.

General illumination for the open mezzanine supply room and for the main bay of the machine shop is supplied by 750-watt incandescent lamps in RLM reflectors with dust-tight glass covers, mounted high enough for the crane to pass under them. On the shop floor the illumination ranges from 20 to 25 foot-candles. Shop space under the mezzanine where the ceiling height (to the bottom of the beams) is 14 ft., is illuminated by fluorescent lamps to an intensity ranging from 20 to 30 foot-candles at work-bench height.

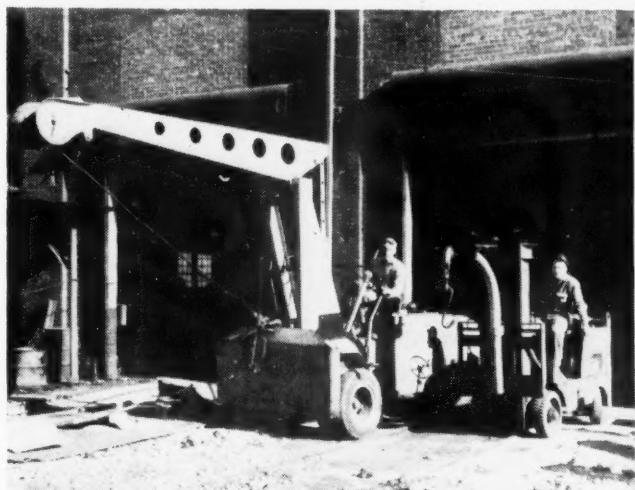
All the overhead incandescent units are mounted with Westinghouse Safe-change hangers. An at-



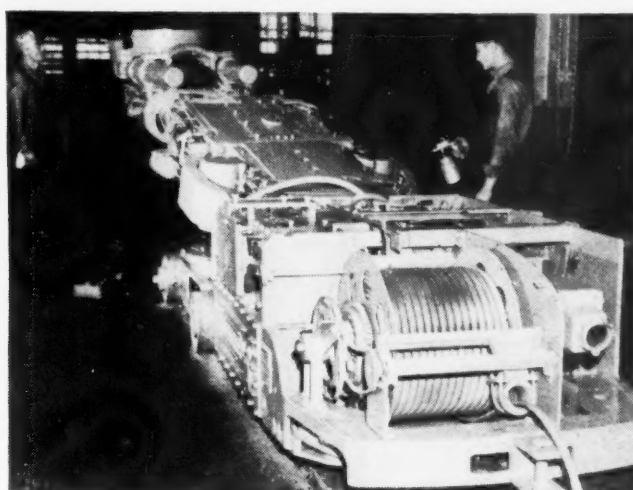
WALKWAY AND STEEL CABINETS in the supply room. Overhead is the machine-shop crane.



THE ELECTRIC SHOP is a space 19x84 ft. across the end of the large building and separated from the machine shop by wire mesh.



TWO SELF-PROPELLING CRANES serve the machine and forge and welding shops and can commute between them.



A TRACK-MOUNTED UNIVERSAL CUTTER receives a coat of paint after a general overhaul in the machine shop.

tachment plug at the hanger must be disconnected before the unit can be swung around far enough to be unhooked and taken down. The same arrangement is used in the forge and welding shop.

Wooden paving blocks constitute the flooring in the machine shop, while in the forge and welding shop, where there are open flames and sparks, cinders are used.

The electric shop, which includes armature-winding facilities, occupies the end of the main shop under the mezzanine, 20x84 ft. plus a 20x20-ft. ell, all partitioned from the machine shop by wire mesh. A bridge crane with a 19-ft. span, equipped with electric hoist and operating on a runway 84 ft. long under the mezzanine, serves the electric shop. In a walled-off space 18x40 ft. under the mezzanine near the other end of the building are the rooms for toilet, locker and shower facilities, and for the offices of Chas. R. Drum, general master mechanic; H. J. Griesemer, assist-

ant general master mechanic; and Fred Combs, shop foreman.

The following list includes the principal items of machinery and equipment already installed in the new shop:

Planer, box type, 72x72-in., with 20-ft. table.

Boring mill, horizontal, 5-in. boring bar, 5-ft. vertical rise.

Radial drill, 4x4 ft.

Arbor press, 300-ton, horizontal hydraulic ram.

Vertical hydraulic press, 80-ton (in electric shop).

Five electric-welding machines, 200-amp. (most of them used in the forge and welding shop).

One electric welder, 400-amp.

Hammond tungsten-carbide tool grinder.

Acetylene generator; carbide capacity, 500 lb.

Power hacksaws (one in machine shop and one in the forge and welding shop).

Tool and surface precision grinders (in tool room).

Twist-drill grinder (in tool room).

Two 32-in. shapers.

Catalin keyseater.

Lathe, 24-in. (in electric shop, for commutator turning and banding, and equipped with band-tensioning device and indicator).

Six lathes, two 16-in. and one each of the following sizes, 36-in., 27-in., 24-in. and 12-in.

Pangborn sand blast.

Layout table, 36x68-in.

Metal bandsaw.

Four drill presses.

Air hammer, 200 lb. (in forge and welding shop).

Universal milling machine (another scheduled for installation).

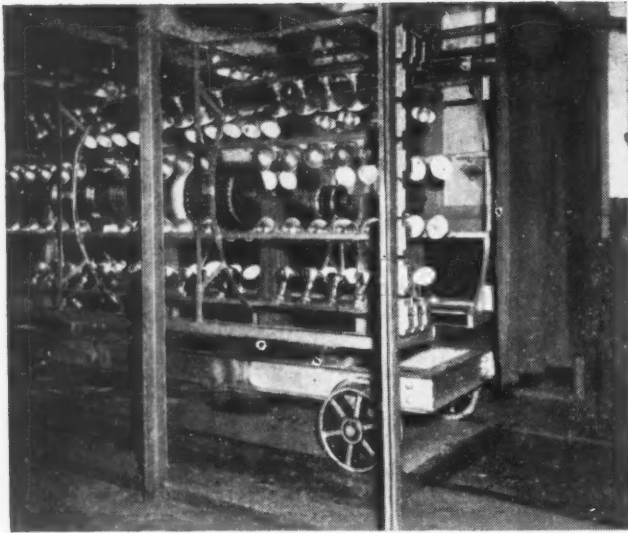
Hyster Karry Krane, self-propelling, rubber-tired; capacity, 5 tons at a boom height of 19 ft. 4 in. and 2 tons at 10 ft. 8 in.

Towmotor, self-propelling, rubber-tired; vertical lift, 108 in.

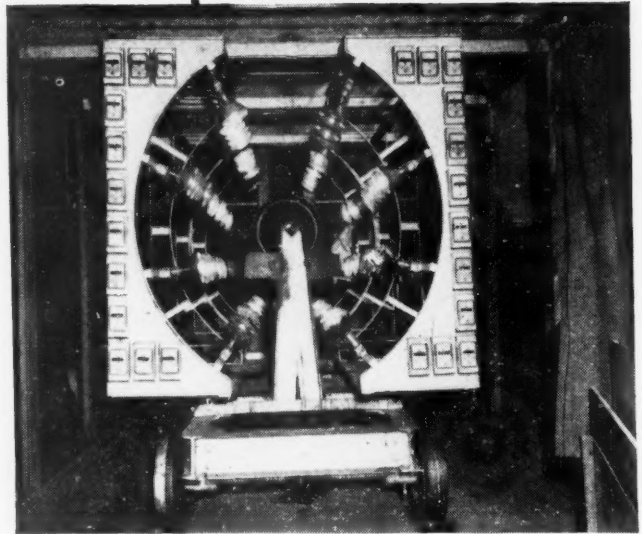
Insulation shear, manually operated (in electric shop).

Two test panels with following

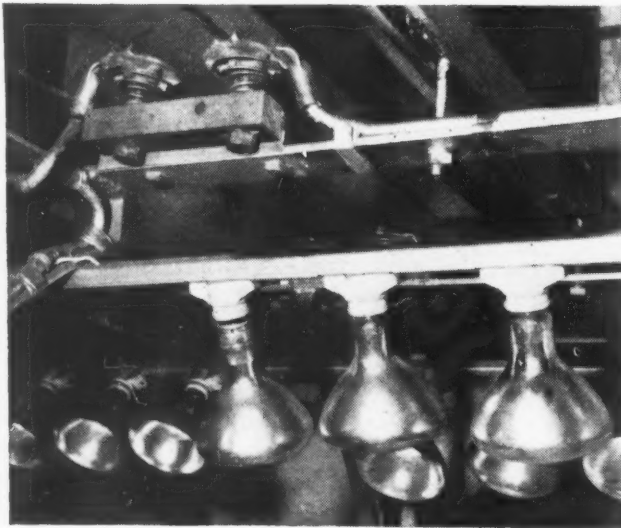
Modern Facilities Speed Vesta Maintenance



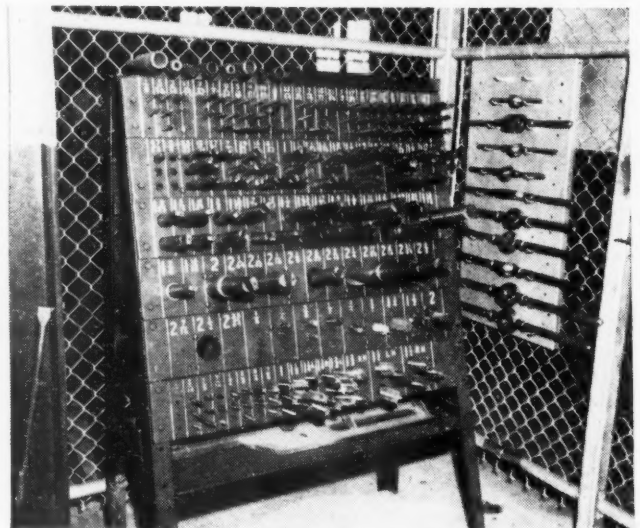
THREE NEWLY REWOUND ARMATURES being rapidly baked by the penetrating rays of infrared lamps.



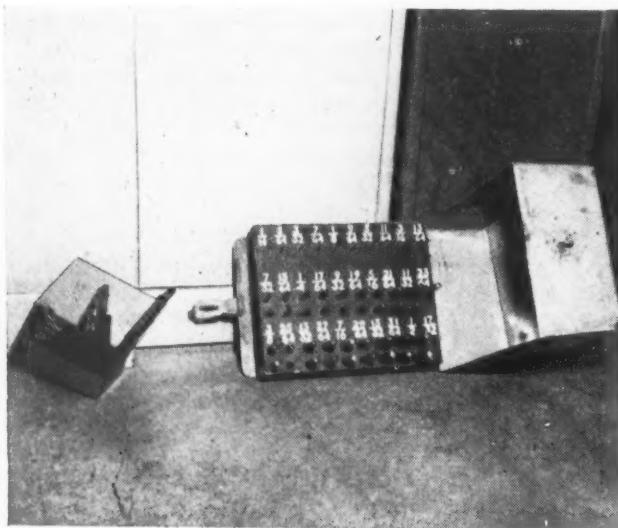
END VIEW OF THE INFRARED OVEN. Each of the 24 switches on the frame end plates controls five lamps.



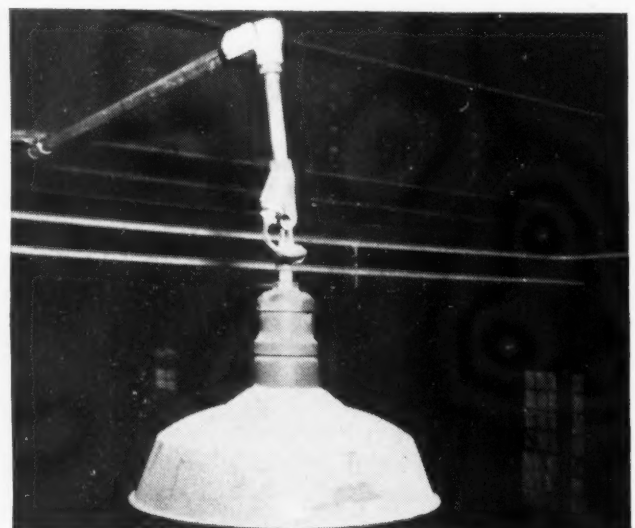
SHORT TROLLEY WIRES and collector shoes (top left) supply power to the movable frames of the infrared oven.



TAP AND DRILL RACK has holes of the right size for each item to facilitate keeping units in their proper places.



COMPLETE SETS of high-speed drills are issued from the tool room for jobs away from the shop.



ALL INCANDESCENT LAMPS in the shop are hung from safety-change fittings.



IN THE SHOP OFFICE: Charles R. Drum (seated, left), general master mechanic, with H. J. Griesemer, assistant general master mechanic; Francis Sargent (standing, left), electrician boss; Ralph Bell, chief armature winder; Fred Combs, shop foreman; and Paul Jones, shop clerk.

voltages: 110 and 200 single-phase, 220 and 440 three-phase, 250 and 350 d.c.

Air compressor, six-cylinder, 7½x7½-in., V-type two-stage, water-to-air cooling, with 75-hp. motor (in forge and welding shop).

Four two-wheel grinders.

High-voltage insulation testing set (in electric shop).

Infrared baking oven.

Dipping vat for armatures and coils.

Most of the work-benches have maple tops. Mechanics and electricians are furnished with steel locking-type tool boxes, which are kept near their working positions. Each box is fitted with a standard set of tools according to the job of the individual. Consequently, he does not have to keep running to the tool room.

The tool-room attendant issues tools and grinds and sharpens them. Kept ready for issuing to men going away from the shop on special jobs are full boxes of small drills and small taps with correct drills for each size along with portable electric drills. Each item is in a separate hole of matching size and, since all boxes are kept full, the tool-room man can tell at a glance if all are returned each time.

Drills and taps, large and small, for issue individually for use in the shop are kept in a rack with steel front, each in a hole of matching size. The front of the rack, 4x4 ft., is tilted back 20 deg. so all parts are easily seen.

Also kept in the tool room are the portable electrical testing instruments. The assortment includes a

cathode-ray oscillograph for checking the mercury rectifiers of mine substations.

The infrared oven heats or bakes armatures and coils quickly and without overheating the surface as a result of the penetrating heat rays. This oven, which was designed by the shop men, is adjustable as to lamp distances from the center line, and as to number of lamps lighted to accommodate any armature from coal-drill size up to and including the 10-ft. long rotating unit of a single-shaft 300-kw. motor-generator for a mine substation.

The 120 infrared reflector lamps, R-40 industrial type, are on 24 circuits of five lamps each, and are controlled by that number of switches mounted on the ends of the two frames which carry the lamps. Each frame can be moved sideways to adjust the lamp distance.

Three-wire power at 110-220 volts is carried to the frames through short trolley wires and contact shoes. The line power can be controlled through a time switch which, if desired, can be set to start the heating an hour or so before work time, so that an armature and/or the coils are properly heated ready to begin or resume a winding job.

The pedestal at the back end of the oven is in a fixed position on the supporting truck. The other three are adjustable as to position. Lamp spacings on the racks or frames had to be worked out so that the lower ones do not hit the pedestals when the racks are moved in close for small armatures. To shield workmen

from the light of the oven, a draw curtain is provided at the end facing the electric shop. When the truck supporting the armatures is rolled out on its track, it is under the bridge crane of the electric shop.

Factory-made fiber-glass insulated coils are used exclusively. Maintenance officials insist that the armature coils purchased must be designed to fit properly; that is, to fit snugly but go in without hammering.

Compressed air, oxygen and acetylene are distributed by pipelines to attachment stations throughout the two buildings.

Steel-shafting stock of the sizes commonly used is kept in a special rack on the main floor of the machine shop. Thus, mechanics need but a short time in securing the stock required for a job. Special alloy-steel shaftings are clearly distinguished from the plain steels by bright red paint on the ends.

It is the shop policy to keep away from manufacturing as far as possible and concentrate on maintenance.

Bridge to Connect New Plant

This general machine shop is at the focal point for maintenance of equipment for Vesta No. 4 and No. 5 mines, which are being connected underground, and for maintenance of the machinery of a new central preparation plant now under way and scheduled to be finished in about two years. This 20,000-tons-per-day plant is being built directly across the Monongahela River from the portal of Vesta No. 5 mine, and the company will construct a bridge across the river at that point.

The central machine shop also serves the company's Shannopin mine, a 4,000-tons-per-day operation, 30 miles distant via State Highway 88. A tractor-trailer outfit has been purchased to transport to the shop any item of the equipment at that mine. Close by the top landing of the shop-incline elevator is an old shop building which will be remodeled into a mine-locomotive shop for the Vesta No. 4 and No. 5 mines.

Vestaburg, where the general shop is located, is approximately seven miles up river (southwest) from Brownsville and nine miles from California, Pa., where the operating offices of the Vesta-Shannopin Coal Division of the Jones & Laughlin Steel Corp. are located. That office is the headquarters of E. R. Cooper, manager of coal mines, and W. E. Hess, general superintendent of the division.



DIRECTING WORKERS and solving production problems underground equip a supervisor for safety engineering and guarantee his understanding of the production man's point of view. This means smooth teamwork between safety and production departments.

Choosing a Safety Director

Picking the Right Man for Director Is Key Factor in a Successful Safety Program—Mining Know-How and Good Personality Attract Cooperation of Production Men—Safety Engineering Opens Way to Bigger Jobs

By **PAUL W. GRAFF**

President, Westmoreland Mining Co., Blairsville, Pa.

THE MOST EFFECTIVE and reliable method of reducing accident frequency and severity rates in coal mining is a carefully planned and integrated safety program. This has been proved by the experience of many coal companies in recent years. Such a program requires a thorough analysis of the facts in each accident, a tabulation of these facts with data from other investigations and a resulting series of recommendations to prevent more accidents like the ones that have happened, as well as those that are possible under existing conditions.

In addition, an appreciation of the necessity of safe work habits must be instilled in the minds of all workmen and supervisors, while top management must be kept aware of the importance of safety in making its

plans and programs for the future. This implies regular safety meetings of employees to discuss recent accidents and to bring to light existing hazards or dangerous practices. It also implies a review or preview of all operating plans in the light of safety and strong cooperation between the operating and safety departments.

Safety a Full-Time Job

A safety program also very definitely implies the employment of a safety director or engineer who can devote his full efforts to this work and, in addition, can spend a considerable amount of time in making routine inspections of surface and underground establishments, the condition of tools and machinery

and the various work methods employed in all stages of production. Such inspections are valuable in themselves for what they accomplish. They also provide an opportunity for the safety engineer to spread the gospel of safety among all employees by personal talks with workmen and supervisors, where real persuasion can function much more effectively than in a large gathering, where personal conversation generally is impossible.

It is not likely that the work of directing a safety program of the type outlined can be imposed upon the mine foreman, superintendent or other production employee because of the numerous responsibilities already placed on these officials. These men must manage the production work, supervise the transportation system, maintain the haulage ways, check the ventilating system, including the condition of many remote and scarcely accessible air courses, and provide adequate drainage for the entire mine. In addition, they have their personnel work as supervisors in charge of one or more groups of workers.

In performing all this work, these supervisory and production men must keep safety constantly in mind and must include it in all their plans because of the very nature of their



ABILITY TO GET ALONG with workers is a prime characteristic of a successful safety director. Talking with small groups and making personal contacts underground are his best ways of doing effective work.

duties. Nevertheless, they obviously will have neither the time nor the energy to conduct an integrated safety program. Therefore, this work must be placed in the hands of an individual not directly connected with the production department.

In general, there are two different plans by which a safety engineer can be chosen—either from among men with little production experience or from among men with wide production experience.

Mining Skill Valuable

One plan means choosing an individual who is somewhat versed in the fundamentals of safety and mining but who is presumably either too young or too inexperienced to be given complete charge of a full safety program. Such an individual often may accomplish a great deal toward the promotion of safety and, under favorable circumstances, may conceivably develop into an efficient and competent safety director. For a long initial period, however, his duties in and around the mine must necessarily be confined to those which can be classified generally under the heading of inspection. Under no circumstances should he be given authority either to interfere directly with the production work or to give compulsory orders to any of the supervisory officials. An otherwise well-functioning mine organization could be effectively disrupted almost overnight if such

authority were granted, because safety officials and production men may sincerely disagree on methods and practices.

A certified mine official is charged by the state mining laws with the duty of keeping his men safe at all times and is answerable in a court of law for any serious mistakes that are made in the performance of his duties. He will rightfully resent the intrusion of a safety engineer inexperienced in production work into his field of authority and will be inclined to question very seriously the wisdom of such an individual's recommendations. Many of the subjects with which safety is concerned are so vitally interlocked with production that only a man thoroughly acquainted with production problems can decide the extent to which various alterations in production practice can be made in the interest of safety.

In fact, the man with a limited experience in production work might not be in a position to decide on the safest way of performing a particular task, even though he may possess some training in the general problems of safety. The foreman who spends all of his time in a given section usually has better judgment about methods of roof control, timbering systems, the placement of machinery in the working places and a dozen other controversial subjects, all of which are matters both of safety and production. As a matter of fact, he is an expert in safety

in his own right if he is a good foreman, for in many cases his work is concerned more with safety than with production problems.

Assuming that the foreman is a capable man who has trained his crews well, so that each workman performs his work smoothly and automatically finishes one job and moves on without question to the next, he may find that, even on his best production days, his time is devoted mainly to the work of seeing that the working places are maintained in a safe condition and that his men are adequately protected at all times. Likewise, there are many days when production moves slowly because of hazardous roof or other conditions. On such days, he must be constantly alert in the interests of safety. True, the mine foreman or superintendent goes over the general methods of handling the hazards with him but the foreman remains in the working place as the constant guardian of its safety and he must decide how the general advice and counsel of his superiors must be applied.

Inexperience a Handicap

A safety engineer inexperienced in production work naturally will encounter serious opposition in the first stages of his work for these reasons and, unless he is especially apt in the arts of getting along with people and assimilating the problems of the production department,

he will at best travel a long and difficult road before his program is effectively established. As stated previously, the time he spends around the operations necessarily will be confined to inspection work and he therefore will be forced to rely completely upon his reports to management for the carrying out of any recommendations he considers pertinent. This places the real duty of safety engineering upon his superiors, who presumably already are occupied with numerous operating and other problems. The result can easily be a complete failure of the program. Even his recommendations will carry less weight if he is inexperienced generally in production work.

He still can train himself in the science of rock-dusting, of determining when rock dust should be applied, of visualizing the safety of certain mining plans, etc., and he still may be able to put his program across by staging effective safety meetings, driving into everyone the conviction that safety is important and making all employees think constantly in terms of safety.

If he succeeds, however, it will be either because of an unusual ability to get along with people and assimilate knowledge and various points of view or because of a natural aptitude for mining and its problems, or a combination of both. In any event, there can be little doubt of the fact that in the long run he might do as well—and very probably would do better—if he were first given several years of actual production work as preparatory training.

Production Man Favored

This leads us to the consideration of the alternative in the choice of a safety engineer—a man experienced in supervisory production work and the problems connected therewith and possessing at least an assistant mine foreman's certificate of qualification. With a little incidental training on the subject of safety in general and the establishment of integrated safety programs for mining in particular, there should be little question of the fact that a man possessing this background, plus the proper personality and enthusiasm for safety, should succeed admirably in an undertaking of this kind.

Coming from the production department, a man like this will be well aware of production problems and should gain easily the support of production men. He will be able

to talk to foremen on their own ground and in their own language and will not be likely to recommend changes in a manner that will be openly antagonistic to this important group. For the same reason, he should experience little difficulty in getting along with the workmen and his words at safety meetings, in company publications and in private conversations with all employees could be expected to carry considerable weight.

Furthermore, his review of operating plans should be welcomed by top management since, as a former production official, he should be able to make suggestions that will be helpful to the operating department. In any event, he can be relied upon not to submit proposals or recommendations that are completely impractical or basically unsound from an operating viewpoint.

Promoting the Safety Director

It can easily be seen that the scales are tipped heavily in favor of the man of this type for the important work of safety engineering. Probably the main reason why more men from the production department have not been chosen for safety work is the fact that such men also make excellent production officials and there is always a natural hesitation in any management to deprive itself of an official who is performing his work well and who unquestionably will be somewhat difficult to replace. There often exists a feeling that such an individual will have bigger things ahead of him if he stays in the production department, that very possibly he may degenerate into the type of man suitable only for safety or inspection work and that his days of advancement will come to an end with his appointment as safety engineer.

This attitude, it would seem, is largely the result of the fact that many of the safety engineers heretofore employed are of the type first described in this article or are misfits in the production department and there is little doubt that many of these do therefore render themselves unsuitable for other work because of their absorption in the problems of safety to the exclusion of many of the other problems of mining. It is also the result of the fact that, in employing safety engineers of the first type described, management often has unconsciously created a department which it recognizes as a necessary feature of any mining company but for which

it often possesses a slight contempt because of the narrow range of activities to which that very management confines it. The world of safety itself can be an absorbing one and the individual engrossed only in that world all too easily may turn himself into a fanatic who is set more or less apart from other employees in the organization.

Broad Field for Safety

However, it is the contention of this article that the importance of safety is so fundamental, as proven by the poor records of the mining industry generally, that top management should enlist a safety department of production-trained officials for whom it has the utmost respect and that the director of such a safety department should occupy a position or status on a par with that of the general superintendent or production manager.

In no event should he be permitted to countermand the orders of the production department but he always should have the right to make recommendations to mine officials and to appeal to the general superintendent and, finally, to the general superintendent's superior if these recommendations are not carried out. He should bear the responsibility of seeing that the mine is adequately rock-dusted and should have a considerable voice in the planning and direction of the ventilation system. As stated previously, he should review all mining methods and projections in the special interest of safety and should concern himself generally with the management of the mines from a safety point of view.

If a status similar to the one described is given the safety engineer, there is no reason for him to be thought of as an individual living apart from the rest of the group and engrossed in his own little world. A large amount of real responsibility will rest with him and he should be sufficiently challenged by the extent and importance of his work to forestall any degeneration of the type described.

In fact, there should be no reason why a successful safety engineer of the type just described should not be chosen to fill any vacancies that exist in the operating department from the position of production manager upwards and it would appear that in many ways this would be an excellent department in which to train men for this important work.

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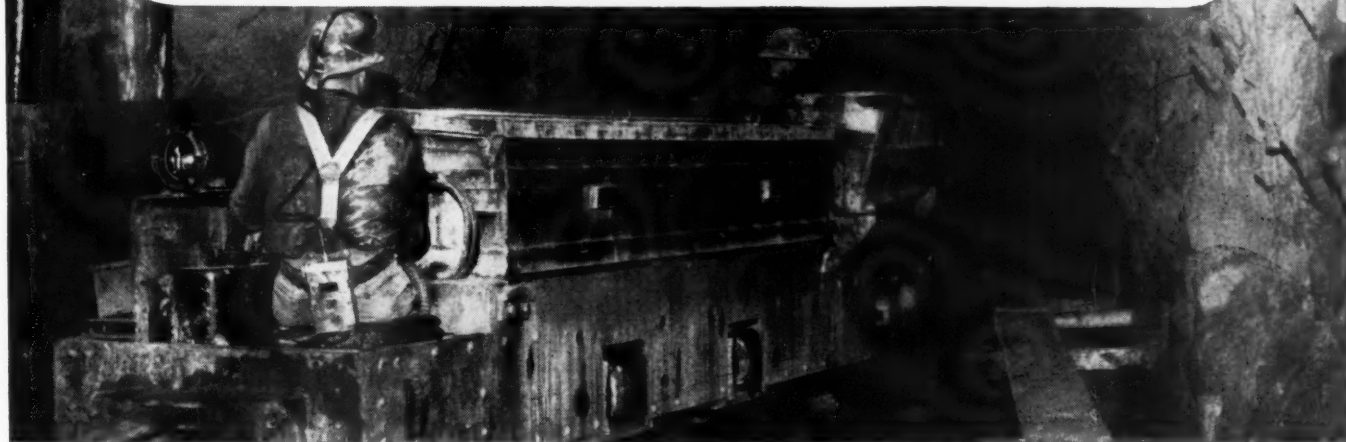
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The Foremen's Forum

Thirteen Mistakes in Handling Men

FOR MOST OF US, making mistakes is easier than doing the right thing, especially in getting along with other people. Yet the ability of a foreman to get along on good terms with his men is a major key in higher productivity and better labor relations. That means a foreman must be on guard all the time against his own human failings. These failings include, among other things, blindness to his own shortcomings, a mind closed to suggestions from others and a failure to allow for individual differences among the men he deals with. These are the big mistakes. Here is how they show up in a foreman's everyday relations with workers:

1. He tries to govern others by his own standard of right and wrong—This is dangerous business. Nobody knows what is right for everybody else all the time. People differ and circumstances differ. That is why a good foreman looks beneath the surface for the reasons why people act as they do. In this way, he learns to understand human motives and make allowances.

2. He tries to set up uniform standards for happiness and contentment—This just doesn't work. People want different things in life. Some want security. Others want attention and praise. Some like variety and others find happiness in routine. A good foreman tries to understand the motives and the goals of people he deals with and does all he can to help them get the things that will make them content.

3. He expects his men always to agree—This is a blind hope. The facts in a case are, to be sure, the facts. The trouble is that people have different ways of looking at the facts and their individual wants and personalities color their interpretation of the facts. The foreman who forgets this is lost. The truth is that living and working wouldn't be much fun if everybody always thought like everybody else, and there wouldn't be much progress, either. Most improvements come because some people think differently from others.

4. He fails to make allowance for lack of experience—Methods that may seem simple to him because he has been on the job for a long time may not be so simple to a newcomer, to whom the job is still strange and the working conditions unfamiliar. A good foreman keeps this fact in mind when

dealing with youngsters and green-horns in his crew. That does not mean that he is slack about safety rules or job methods. It does mean that he stays on his toes to watch for mistakes that grow out of inexperience and takes every opportunity to drive home the lessons that should come from mistakes.

5. He tries to put human nature in a straitjacket—this can't be done. Some people have quick tempers, some are not easily upset, others have a sense of humor and still others have thin skins. The foreman has to size up his men by careful study of their natures and give each one the kind of treatment that makes him a better member of the production team.

6. He refuses to give ground on unimportant matters—It is easy to win small arguments and then lose the big battle. For example, a foreman who keeps saying "No," however trifling the issue may be, gradually builds up resentment among his men. This resentment can easily come to a head when there is something really important to be decided. Then the foreman finds himself against a stone wall. Better give up on a few small matters and save your ammunition for a big issue.

7. He expects perfection in everything he does—He might as well ease off, because nobody, not even himself, is perfect. The right thing for a foreman to do is to study himself and find out his weaknesses. If he does this, he will be able to keep his guard up

and also find ways to offset his shortcomings.

8. He worries himself and others about things that can't be helped—There are better ways to spend energy than in crying over spilled milk. A good foreman makes the best of every situation, whether it is good or bad. However, there is not much excuse for spilling milk twice from the same bottle. If a mistake is made, a good foreman accepts it as something that is past but he takes care that the same mistake is not made again.

9. He doesn't look for opportunities to help others—This does not mean that a foreman ought to pitch in and load coal just because one of his crewmen gets tired. It does mean that there are lots of ways to help people along. All some people need is a friendly word. Others may need instruction. Still others may need only a chance to talk about their troubles to somebody who tries to understand. A good foreman keeps his eyes open for ways to help people out.

10. If he can't do a job himself, he thinks nobody else can—One secret of getting along with other people is to give them a chance to express themselves, whether it is by speech or by rigging up a new way to do something. A foreman who is up against a problem that he can't solve by himself has no business giving up. If he will only look around a bit, there is a good chance that he can find somebody, either one of his superiors or one of his crewmen, who has an idea that will get the job done.

11. He doesn't believe in anything that cannot be proved—There are lots of things a man can count on that cannot be proved. In fact, faith in his fellow men, whose good qualities cannot be added up like a column of figures, is one of the cornerstones of getting along with people. It's a good idea to believe in people. Most of the time, their motives are good and they want to do a good job. A good foreman, therefore, believes in his management and his men as well as the future of his job.

12. He does not allow for the weakness of others—A good foreman knows the weaknesses of each of his men. That knowledge does not destroy his faith in his crew but it does enable him to assign jobs that his men can be depended upon to do.

13. He does not measure men by true standards—The measure of a man is not the clothes he wears or the house he lives in or shape of his face. It's



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Putting Across Safety Ideas

A FOREMAN WHO HAS TROUBLE selling safety to his men can try an approach suggested by R. H. Nicholas, director of safety, Pittsburgh Coal Co., whose short article on safety promotion, printed below, was published some time back in the *P.C.C. News*. Here is what Mr. Nicholas says:

"Safety is one thing which cannot be turned over to someone else. It is a job in which every person takes part—and no one else can do your share for you. It's true that some supervisor is responsible for the overall safety of that portion of the mine in which you work but he cannot do the job alone. He needs the full cooperation of every man in the section.

"Each employee is his own safety director in that every day he is called upon to make decisions that affect his personal safety. What are some of these everyday decisions employees are called upon to make?

"When work involves loading coal, by hand or mechanically, it is necessary to decide when to place additional roof support. Life may depend upon the willingness to decide fairly and not be influenced by a desire to save time. If posting is done when needed, safety is likely to be more readily assured than it is if the job is put off until later.

"The cutter, faced with making a decision when behind in his work, may decide upon a number of short cuts, any one of which could be disastrous to himself or others. He could decide to take the machine to the face without first making an examination for gas and other dangers. This act could

cause a gas ignition that would affect the safety of many men. He might be injured by falling roof that was not examined and made safe. He might sump the machine in fast feed to save a few minutes and in so doing subject himself to the danger of serious injury should the machine kick and get beyond control.

"A driller may be behind in his work and decide to make up time by not drilling standard holes. The shot firer could decide to go along with the wrong decision, charge and then shoot the improperly placed holes. A blown-out shot might result and we all know that this can cause a mine explosion.

"Your decisions are important to you and your fellow workers. Do not be influenced by 'Old Man Carelessness' when work demands that a decision be made. Don't pay any attention to the 'little man' that gets on your shoulder and tells you that nothing will happen if you go ahead and take a chance. That's where you come in. Stop and think what is best for you. Make the decisions in your favor and you will be safe from injury.

"Make sure that no accident occurs in your working place or section because you forgot or neglected the safety rules. Think carefully before making your decisions and remember that every decision, large or small, is important enough to require serious attention. Keep posted on new conditions that need special care. And from time to time check on your work habits to correct any carelessness that may have crept in."

what is inside that makes a man—his honesty, his ambition, his consideration for others and his eagerness to do a good job. A good foreman sizes up his men by these yardsticks. Thus he comes to a real understanding of the men he deals with. That understanding is the biggest step a foreman can take toward better labor relations.

—Adapted from *Gould Battery News*

Making the Roof Safe

By Don Couch
Safety Engineer

Piney Fork Mine, The Hanna Coal Co.

Almost one-half the injuries in the coal industry are chalked up by one cause—roof falls. Yet, because bad roof conditions are so common, they don't get the respect they deserve. Familiarity breeds contempt. In other words, we become so familiar with roof conditions and timbering that we

sometimes yawn in the face of danger.

Of course, a thorough, painstaking knowledge and persistent alertness against roof conditions are fine safeguards against falls but good timbering can reduce these accidents immeasurably.

There's good timbering and there's bad. Time studies show that it does not require any more time to install timbers properly than it does to put them up wrong. It just requires that the foreman be smart enough, conscientious enough and thoughtful enough to see that his men do the timbering job right for their own protection.

Ideal timbering means the following: timbers of the proper length; setting timbers on legs or posts that are sawed straight on the top and bottom; using straight-cut cap pieces to tighten timber against the roof; and spacing timbers properly to control the roof condition in each spot.

But conditions aren't always per-

fect, so here are a few tips on how to make timbering better:

1. Where timbers are set on timber legs in hitch holes, the bottom of the hitch hole should be on top of the coal. All the slate or soapstone should be removed because it softens when exposed to air and allows the timber leg to tilt, thus twisting and weakening the timber.

2. Timbers that are set on posts with the ends not square will twist on top of the post. When the weight settles, they may kick out, or they may be knocked out very easily by moving equipment.

3. Cap pieces should be placed squarely against the roof and timber and not on an angle, which can cause the timber to twist.

4. Quite often timbers are set where the roof has sagged and thus do not permit the timber to fit up flush with the roof. Unless blocks are placed between the roof and the timbers directly over the posts at the timber ends, there will not be an even distribution of weight on the timber. At all times; the timber should fit squarely against the roof from one end to the other or be blocked with cap pieces so that the weight will be distributed evenly on the entire timber.

5. When short timbers are in use, proper clearance should be maintained. Then no danger is present when moving equipment could otherwise dislodge the timber, causing falls or accidents due to squeezing between the post line and equipment.

6. Where end jacks are used under face timbers, care should be taken to install the jacks squarely under the ends of the timbers to avoid twisting the timbers. This twisting may cause the end jack to kick out. The end jack, when used properly, is very effective and permits the loading machine to recover coal that otherwise would have to be shoveled by hand or lost completely.

7. Timber jacks used by timbermen for raising timbers always should be well maintained and the moving parts kept well oiled to permit the jack to give its best service.

8. When the jack is placed to raise the timber, care should be taken to see that it is placed squarely on the bottom to avoid the jack's kicking out and allowing the timber to fall. If care is used in operating timber jacks while placing timbers against the roof, timbers can be set properly and accidents due to lifting can be avoided.

9. Be sure to test the roof frequently, always use the ever-necessary safety post in any of the operations and eliminate guesswork.

It all adds up to this: Practice "Safety Round the Clock," know your job, be sure, be conscientious—and bad roof falls can be controlled and accidents reduced to a minimum.

—Hanna Coal News

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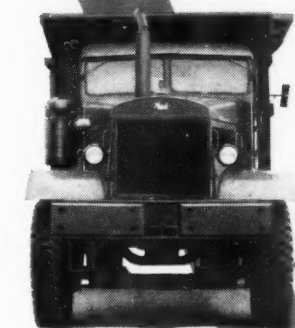
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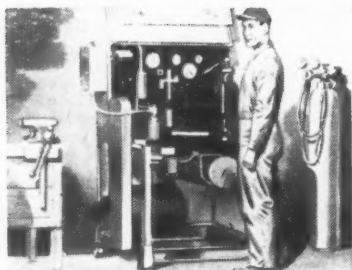
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Operating Ideas

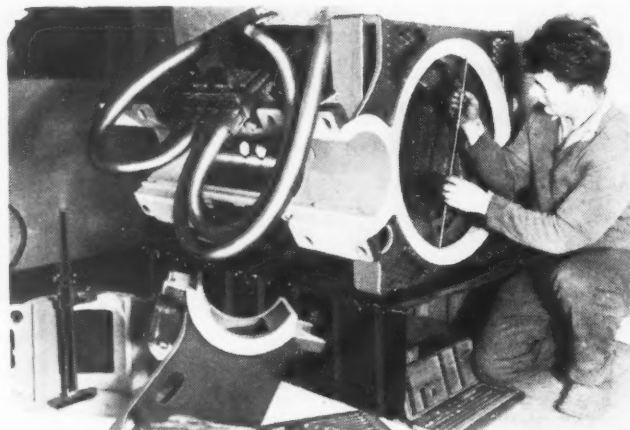


FIG. 1—A TYPICAL "solid-type" traction-motor frame.

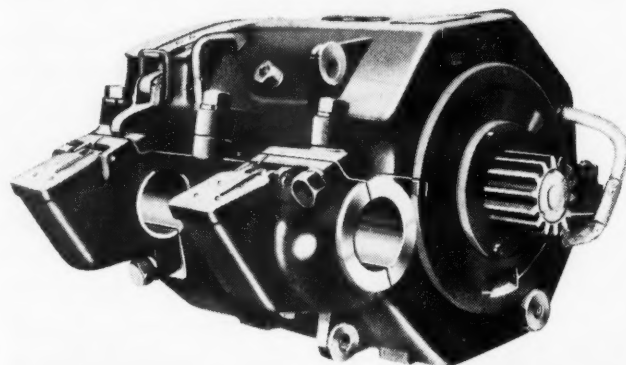


FIG. 2—"SPLIT-TYPE" motor frame, showing separation line.

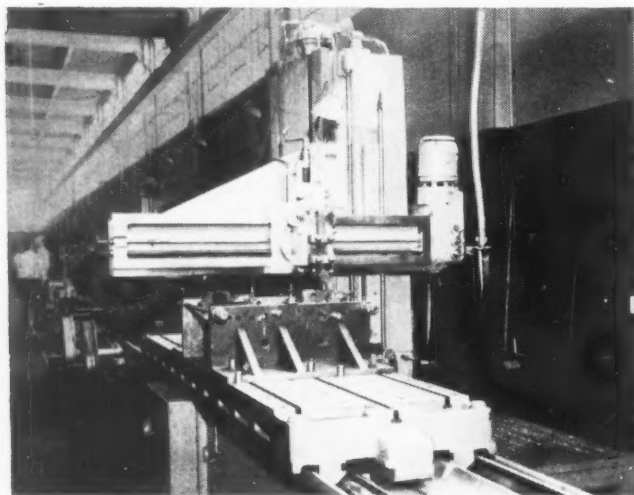


FIG. 3—HEAVY DUTY PLANER on which the mating surfaces of each half of a locomotive split-frame motor and axle-cap mounts are machined, utilizing special jigs for positioning the motor frame.

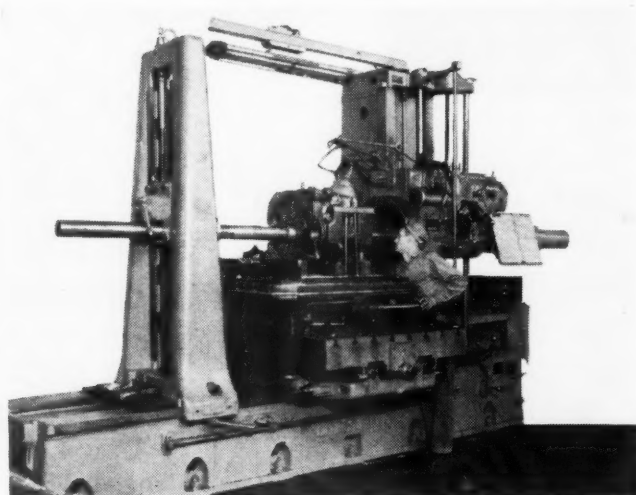


FIG. 4—PRECISION horizontal boring mill used for accurate boring and facing of armature-bearing-housing "fits" and axle journals. The two parallel borings are accomplished in a single set-up.

Rebuilding Locomotive Field Frames

By W. E. WOLFE
Plant Superintendent
National Electric Coil Co.
Bluefield, W. Va.

THE STURDY APPEARANCE of a traction-motor field frame often is as misleading as the robust appearance of a man who may appear to be healthy but actually has many ailments—usually internal. A field frame supports and positions field coils, pole pieces, brushholders, armature, bearings, connection cables, etc., in the same manner that the human skeleton supports vital organs of the body. In addition,

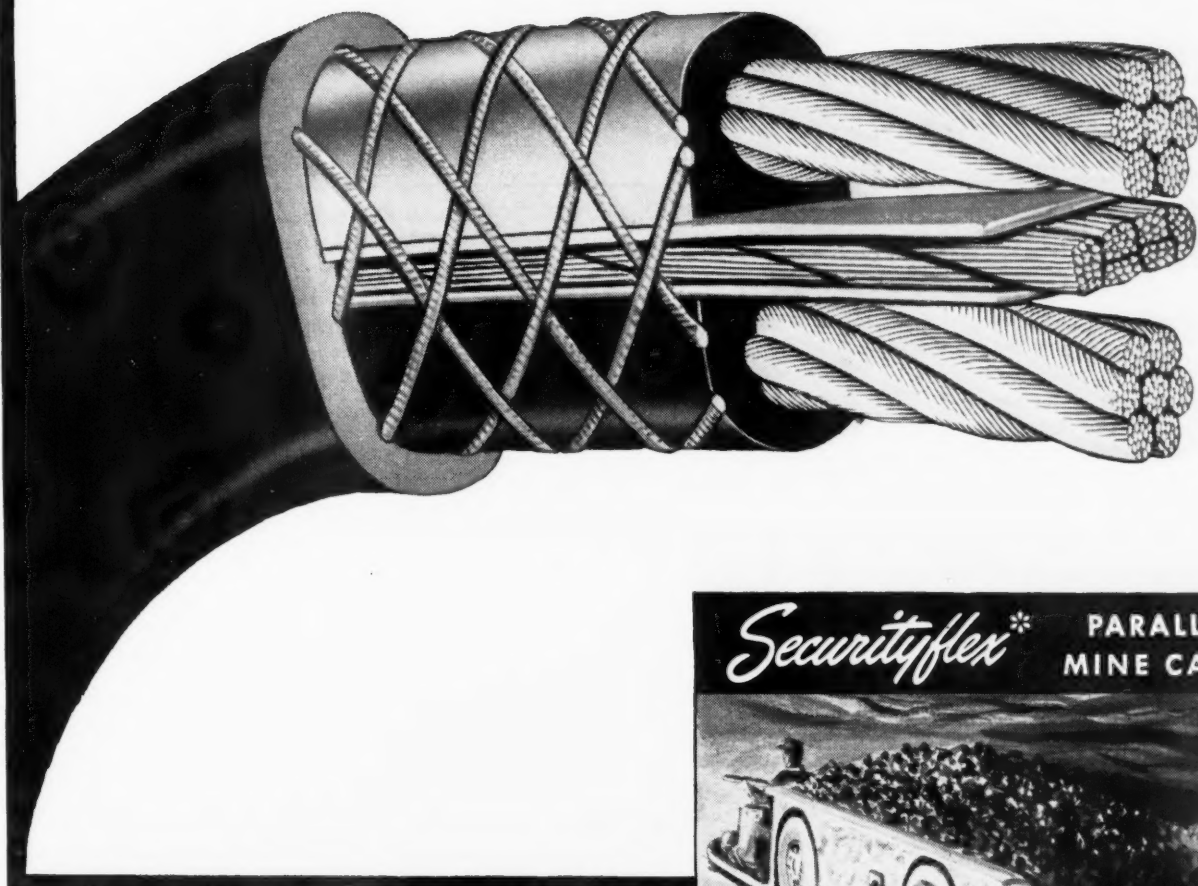
the field frame provides a magnetic path to carry the magnetic flux from one pole to the other.

Some field frames are known as "solid-type," (Fig. 1), while others are known as "split-type" (Fig. 2). Both are axle mounted; i.e., the motor is supported by journals on the axle between two of the locomotive wheels. The motor has a heavy bearing or journal on one side of the frame through which the axle rotates as it is driven by the pinion on the armature of the motor through a gear.

Locomotive motors present an interesting though difficult problem, since they must withstand the severe strain imposed upon them by varying

loads at varying speeds, plus the combination of vibration and strain resulting from trip motion and roadbed shock, often with rapidly changing ambient temperatures.

Causes of motor failure may be numerous and varied. Many electrical failures are traced to mechanical defects in bearings, shafts, loose pole pieces and journals. An over-heated journal may warp the motor frame, causing misalignment in the armature shaft or bearing housing, with a resulting failure. Normal vibration and shock often cause motion and wear on armature-shaft bearing mounts, making the mountings loose on the frame. Often, the outer race of the bearing becomes loose in the mounting and actually rotates. Most mine-locomotive motors have "split-type" frames for



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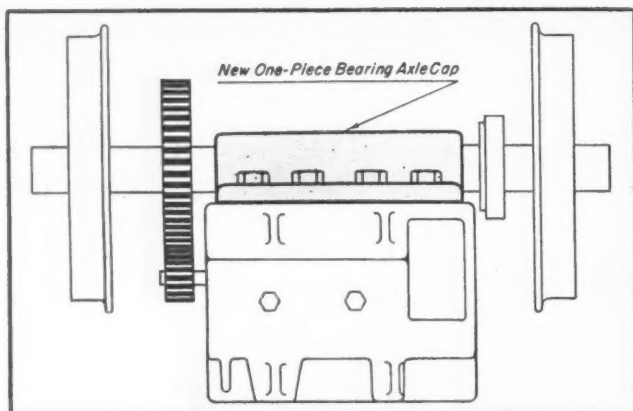


FIG. 5—ONE PIECE axle-bearing cap provides an extremely rigid mounting that resists loosening and the resulting misalignment that destroys pinions, gears, bearings and often the complete motor. It has a machined-in key for the full length of the cap on both the top and bottom mating surfaces and additional cap screws also add to the rigidity of the assembly.

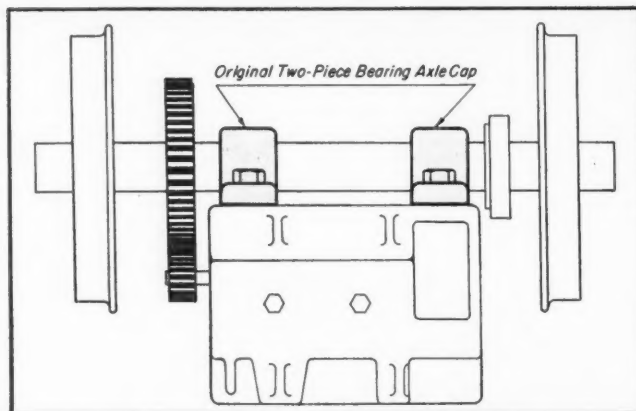


FIG. 6—TWO-PIECE axle-bearing cap construction does not offer the rigidity found in the one-piece construction (Fig. 5). Under heavy shock loading, it is more susceptible to loosening and misalignment and also is more easily broken than the solid one-piece axle-bearing cap. In rebuilding older motor frames, replacement of the two-piece cap is a definite improvement.

ease in making internal motor repairs. The joint between the two frame halves is an added source of potential wear and trouble, which is not a factor in the "solid-type" frame. Wear and resulting looseness at the joint cause bearing misalignment and an uneven air gap between the field poles and the armature. The magnetic circuit between the back side of one pole and another often is broken and ultimate failure of the motor usually is hastened.

While repair of a worn magnet frame will soon equal the cost of a new one in armature rewinds, gears, pinions and bearings, the magnet frame should not be discarded. Rather, with experienced modern welding and precision machining, it can and should be rehabilitated and made as good as new—often better than new. Weak spots or points of recurring trouble that show up in service can be reinforced. Where service conditions are changed and impose new strains that were not factors in the original design, readjustments should be made.

In rehabilitating worn magnet frames, restoration of the original air

gap is of prime importance. This is the basic factor that determines the welding procedure and quantity of build-up metal applied. For a complete rehabilitation job, the flat mating surfaces between the frame halves, the armature-bearing-mount surfaces and axle caps are built up by welding. The first machining operation then is to plane the mating surfaces of each half of a split motor frame. This operation ordinarily is performed on a heavy-duty planer with special jigs for positioning the motor frames. The axle-bearing-clamping surfaces also are machined on this planer set-up. Following this machining process, the holes for clamping bolts are drilled. The halves of the split frame can now be bolted together, the axle caps bolted in place and the frame located with special fixtures on the precision boring-mill table. Here, as in the previous metal-removing operations, all machining is based on the center line of the pole faces. The surfaces for the armature-bearing housings must be machined concentric with the pole faces. With this same boring mill set-up, the axle bearing, with caps in

place, is bored. Parallel boring of the armature-bearing "fits" and axle bearing is accomplished by this single boring mill set-up method since it is difficult to obtain parallel bores on machine tools requiring a double set-up. This repair process is a specialty, and as such, requires expensive and accurate shop tooling ordinarily not found in the average machine shop. In carrying out a program for rehabilitating field frames, a broad experience in the technique and a knowledge of its inherent characteristics is paramount.

Among the important factors in rebuilding magnet frames is the use of modern welding techniques to apply a wear-resisting metal to the bearing "fits." This is applied over the original steel casting, which, while it was designed from the standpoint of magnetic and structural qualities, is not always the best material to resist wear at the bearing "fits."

Another improvement to older motor frames is the use of a one-piece axle cap to replace the standard two-piece cap. A rigid mounting results, which prevents misalignment and, in turn, reduces excessive wear (Figs. 5 and 6).



HANNA'S NEWEST 40-YD. shovel has a 120-ft. boom.

Torque Limiters Protect Shovel Drive

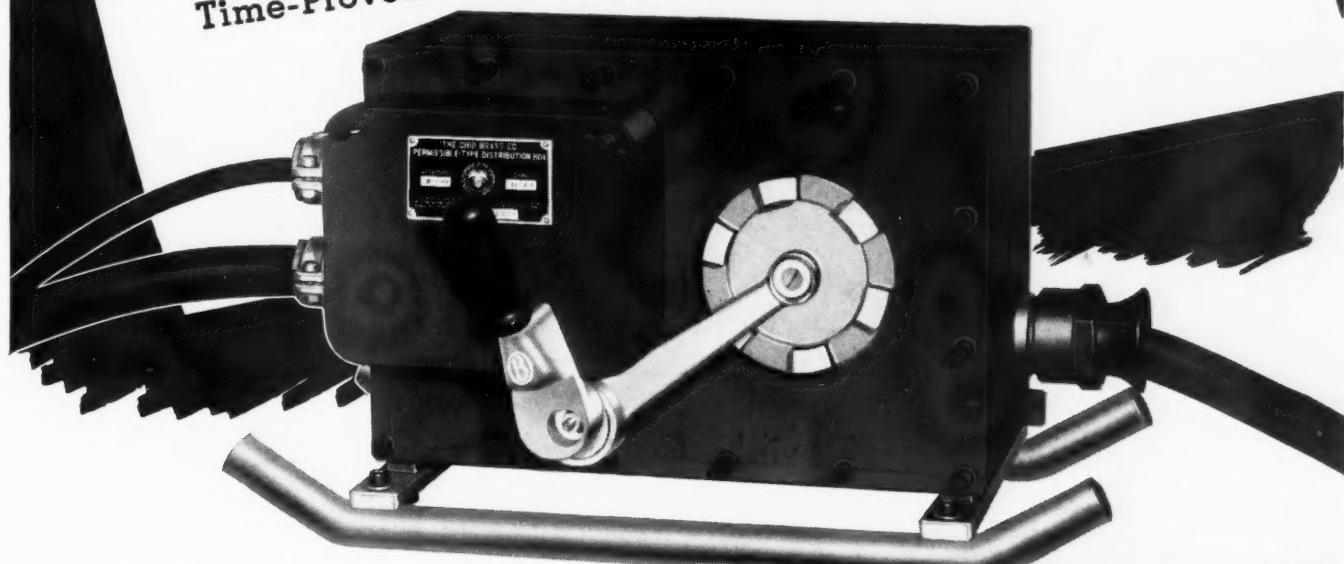
FOUR TORQUE LIMITERS, one in each driveshaft to the crawler units, are among the mechanical and structural improvements in the new Type 5561 40-yd. Marion shovel at the Georgetown No. 12 mine, Hanna Coal Co., St. Clairsville, Ohio.

The torque limiters, shown in the accompanying photo, protect the driving mechanism of the crawlers from abnormal mechanical strain. Should the shovel attempt a move with a boulder wedged in front of a crawler unit, the driveshaft to that unit will be relieved of the strain through slippage of its torque limiter. Each torque limiter is adjustable.

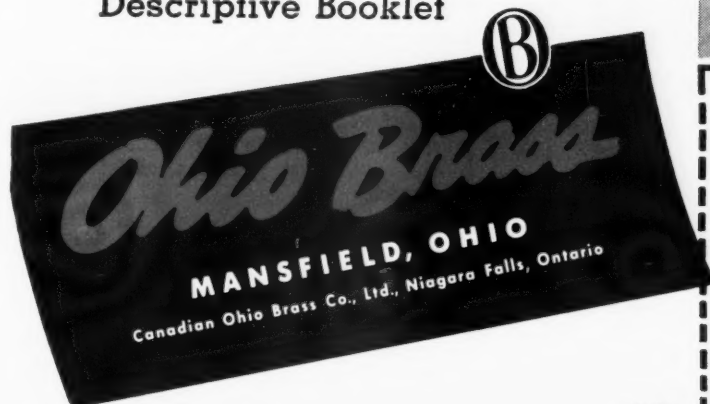
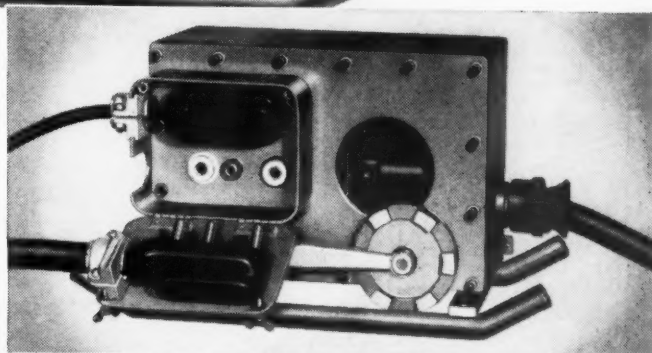
Wider use of alloy structural steels plus the redesign of the boom, stiff leg and crowding handle has effected a weight reduction of 17.5 percent in the Type 5561 Marion shovel, according to the September issue of the Marion

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TORQUE LIMITERS form part of the driveshaft to each of the shovel's crawlers.

Groundhog. Using a lattice-type boom design with alloy chords and pipe bracing has reduced the weight of the boom 33 percent per foot of length. This made it possible to increase the boom to 120 ft. for the new 40-yd. design, as against the old-style 105-ft. boom used on the 35-yd. shovel. Thus the range, capacity and cutting effort for the new 5561 machine has been increased. The crowding handle for the new 40-yd. shovel is 2 ft. longer and the stiff leg has been lengthened 3 ft.

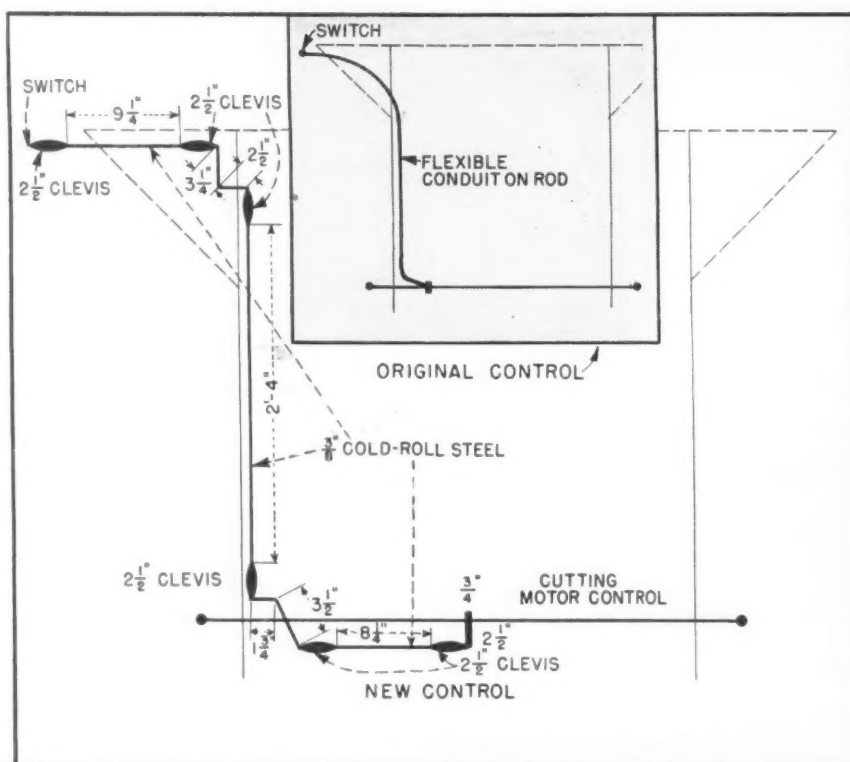
The weight of the dipper, bail, handle and its load of material is 4 percent less for the new 40-yd. model than for the old 35-yd. unit. The dumping radius and maximum dumping height has been increased to 116 ft. 6 in. and 80 ft. respectively. For the old-style 35-yd. unit, these ranges were 113 ft. and 75 ft.

The following table shows how a machine equipped with a 40-cu. yd. dipper and new front end compares with the old-style 35 cu. yd. machine.

COMPARISON TABLE

	35-cu.yd.	40-cu.yd.
Boom	105'	120'
Dipper handle.....	57'9"	60'6"
Maximum dumping height	75'	80'
Dumping radius at maximum height	113'	116'6"
Maximum dumping radius	116'	120'
Bail pull—maximum	100%	100%
Cutting effort at lip	100%	133%
WR ² —average	100%	104%
Weights of dipper, bail, handle and material	100%	96%
Weight of boom, stiff leg and crowding handle	100%	82.5%

Rod Replaces Flexible Cutting-Machine Control



A ROD CONTROL that is easy to adjust, oil and maintain has replaced the flexible-conduit assembly ordinarily used on cutting motors on Sullivan 10-RU machines at Mine No. 63, Consolidation Coal Co. (W. Va.), Monongah, W. Va. The new control, shown in the accompanying diagram along with a diagram of the original control, was developed by Clarence A. Yost, mechanic at Mine No. 63.

The flexible-conduit assembly was difficult to maintain in working condition. Dust would work itself into the conduit and bind the steel wire until the operator could not move it. Such binding often caused the steel wire to break at one or another of the curves.

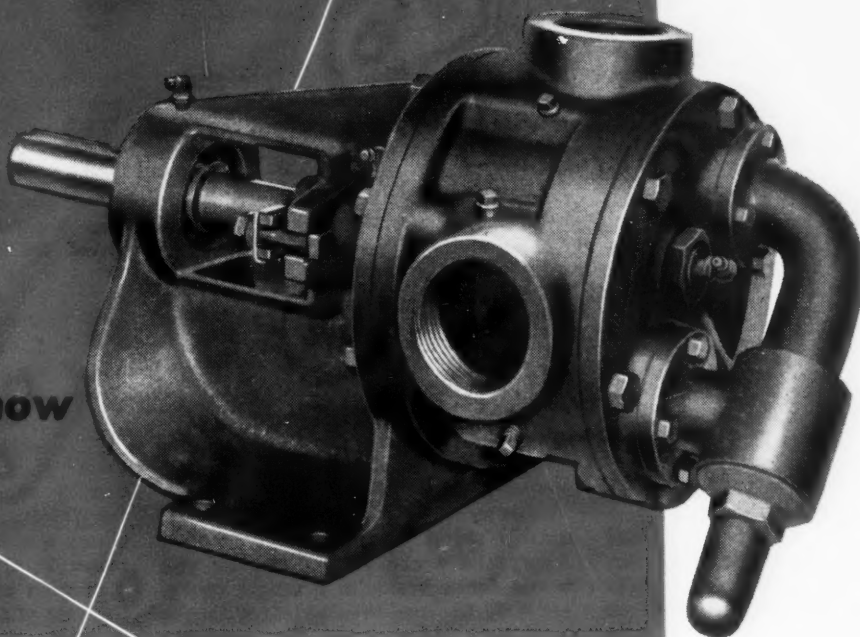
The new control, using $\frac{3}{8}$ -in. cold-rolled steel rods and six $2\frac{1}{2}$ -in. clevises, as shown in the accompanying diagram, now provides satisfactory service.

DUST OFTEN JAMMED original flexible conduit control (top) and caused wire to break at curves, thus stopping the cutting machine. New steel-rod control (main part of drawing) is easy to adjust, easy to lubricate and easy to maintain. No breaks assure continuous cutting.

only **2** parts move

in this low-cost liquids-mover!

available now



Yes, there are only two moving parts in Fairbanks-Morse Rotary Pumps. These exceptionally compact liquids-movers, with their simplicity of design, bring you low-cost pumping at high efficiency. A precision-cut rotor and pinion do all the work. There are no complicated parts to cause trouble . . . no worries about suction leaks . . . no vapor locks.

Mixing tanks, laundry and dry cleaning machinery, machine tools, wherever you use one of these positive acting pumps, you can be sure of definite rated output. There is a constant pumping action . . . no vibration or shocks to affect pump life. Most sizes and modifications are available from stock. Fairbanks, Morse & Co., Chicago 5, Illinois.

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ROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT

Welding Pulleys and Gears Without a Preheating Furnace

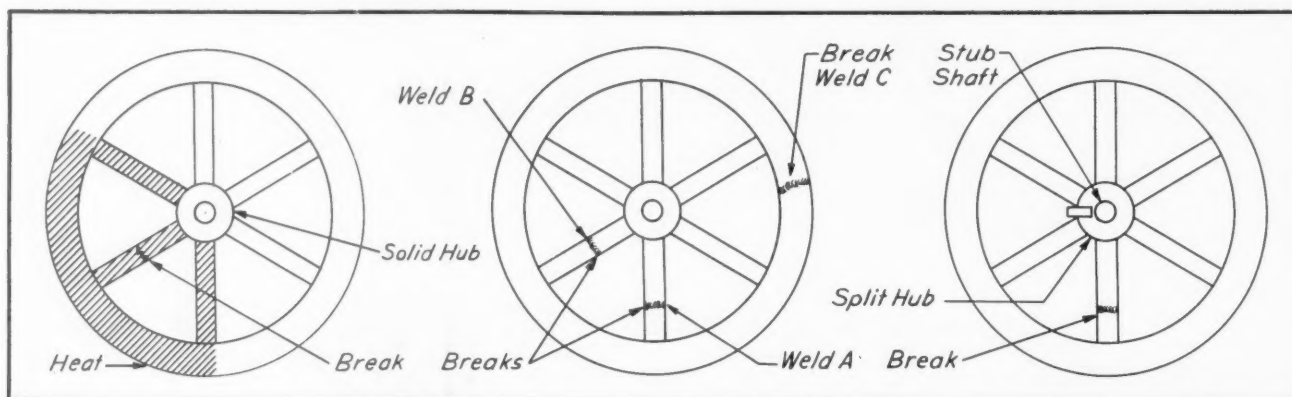


FIG. 1—WITH ONE SPOKE fractured near the hub, heat the adjacent spokes and rim section. Keep even heat in the broken spoke and complete the weld.

FIG. 2—WITH BREAKS in two spokes and the rim, as shown, welds are made in the order A, B, C. Use a wedge bar or jack to maintain pitch dimensions.

FIG. 3—BEFORE WELDING spokes of the split-hub-type gear or pulley, clamp a stub shaft of the correct diameter in the hub. Then proceed as in Fig. 1.

THESE SUGGESTIONS for bronze—or fusion-welding of broken cast-iron pulleys and gears by using a blowpipe for preheating are offered by *Linde Tips*, published by Linde Air Products Co.

"In emergencies or when the casting is too big, a preheating furnace may not be practical," the publication points out. "Bronze-welding is usually recommended because less heat is required than for fusion-welding. Less heat produces less expansion.

"One Spoke Broken—When a single spoke is broken near the solid hub of a pulley, as shown in Fig. 1, the procedure for controlling stresses is simple. First vee the break from both sides. Then heat the entire gear with the blowpipe flame. It should be just warm enough so you can't hold your bare hand on the gear. Then heat the spoke on each side of the broken spoke slightly more than the rest. The

rim section within the three spokes should also be heated a little more. At the same time, gradually heat the area at the break until it reaches bronze-welding heat. In this way you can make the weld quickly without losing the preheat on to the adjacent spokes.

"When the weld is completed, the adjacent spokes and rim section should be reheated slightly until the weld has begun to cool. Keep the entire part covered to avoid drafts and rapid cooling.

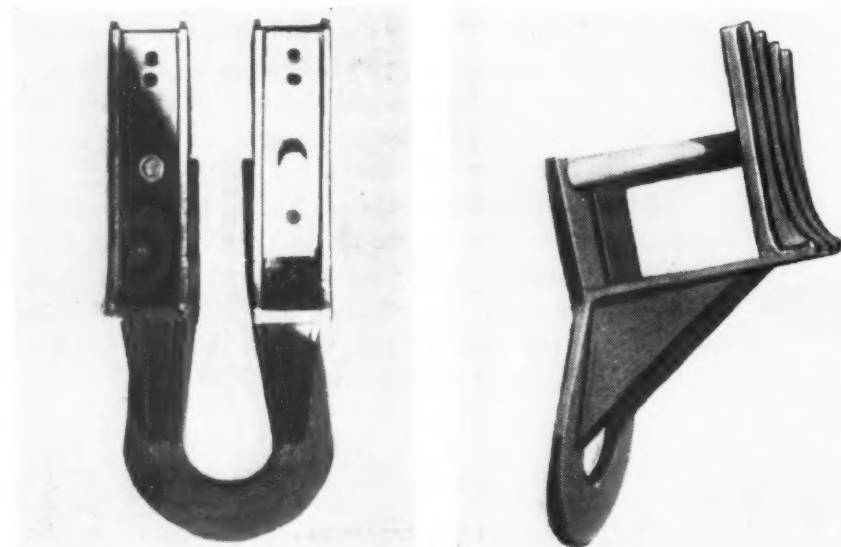
"Several Breaks—When there are breaks in the rim and the spokes, as shown in Fig. 2, the order of welding is important. After you vee the breaks properly, make Spoke Welds A and B in that order. Do not attempt Weld B until Weld A has completely cooled. Apply the preheat the same as you would for a break in a single spoke.

"Weld the rim break last. With the blowpipe flame, heat the adjacent

spokes. If the break is about half-way between spokes, heat both spokes alike. If a break is close to a spoke, give that spoke more heat. Also slightly heat the spokes on each side of the one near the weld. Use a jack or wedge bar to help keep the fractured ends slightly separated. Do not apply too much heat to the rim in the vicinity of the break or you will create pressure in the weld. The heating of spokes, plus a slight heat in the rim section, plus some form of jacking will help you maintain pitch dimensions. Again, avoid drafts and rapid cooling.

"Split-Hub Pulleys—Spokes of the split-hub-type gear or pulley (Fig. 3) can be repaired easily, too. Prepare the fracture in the usual way. Then clamp a stub shaft of the correct diameter in the hub. This will prevent distortion of the hub. Then carry out the rest of the operation as you would a single-spoke break as in Fig. 1."

Assembly Cuts Dipper-Stick Repairs



"HORSESHOE" attached to the open end of a power-shovel dipper stick eliminates the tendency of the two halves of the dipper stick to vibrate, twist, spread and crack.

THIS ARC-WELDED "HORSESHOE," illustrated and described in a recent issue of the *Hobart Arc Welding News*, has saved a large contractor hundreds of dollars in minimizing power-shovel dipper-stick replacements and repairs. The unit is attached to the open end of the dipper stick to eliminate the tendency of the two halves of the stick to vibrate, twist, spread apart and ultimately crack.

The "greenhorns" are a built-in feature, which facilitates bolting the complete assembly to the dipper stick. The horseshoe is fabricated entirely from steel plate, flame-cut to shape with a manual cutting torch and arc-welded throughout. The part resembling a horseshoe is made of 1-in. plate and is offset or bent to 30 deg. The balance of the assembly is $\frac{3}{4}$ -in. plate except the boxed-in gussets, which are $\frac{1}{4}$ -in. plate, and the greenhorns, which are $\frac{1}{2}$ -in. plate.

The first unit made, using all new plate, cost \$27.80. The assembly illustrated cost \$19.85 complete.

**TD
24**

STRIP MINING "CHAMP"



They don't come any tougher than the International TD-24—and we mean on strip mining jobs.

Here's an example. At Trafford, Alabama, Calvert & Youngblood are stripping 25 feet of overburden from a 24 by 30 foot seam of coal. It's fine coal, too, known as Black Creek. But it lies at a steep angle—unusual for bituminous—and getting that overburden off is an uphill job. Did the TD-24 lick it? Well, here's what owner John Calvert says:

"The TD-24 is a top-notch tractor. We

bought it expecting that it would go right to work and give us no trouble. It is doing all we believed it would."

Yes, that TD-24 is 'dozing full blade-loads of dirt up the slope and it's really heaving the overburden off that coal seam. Here's another tough job that the TD-24 knocked over.

Your strip mining problems may be tough but a visit to your International Industrial Power Distributor will show you how they can be licked. Better take a look at the champ—the TD-24.

Industrial Power Division

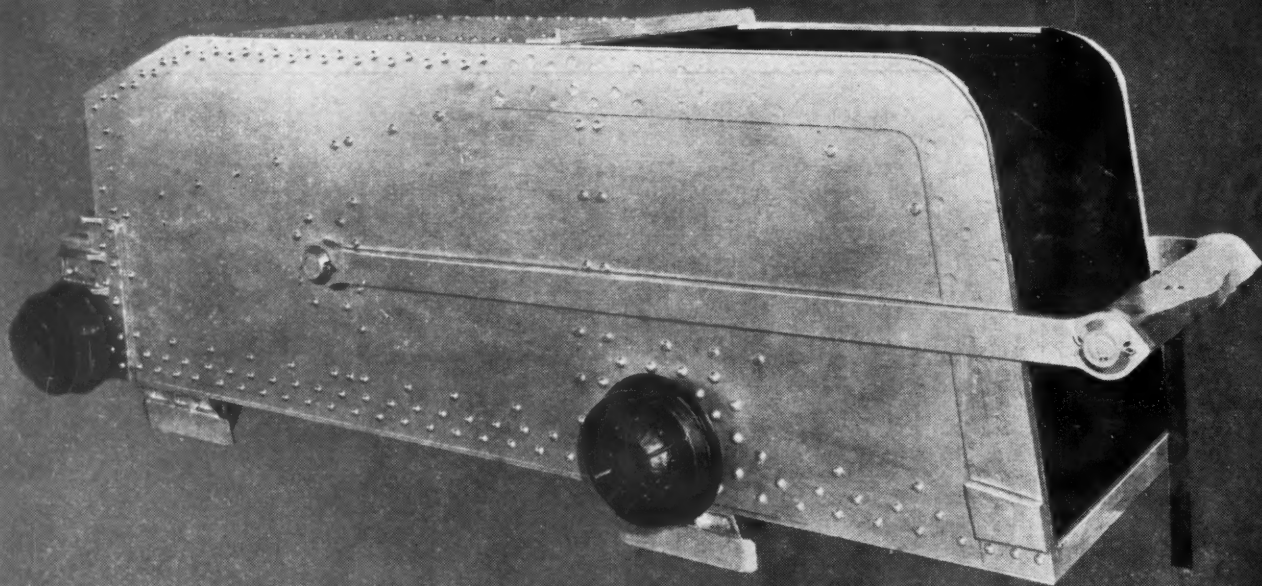
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Make skips and cages last longer, carry more payload. Spend less on maintenance . . . build them of Alcoa Aluminum Structural Shapes, Sheet, and Plate.

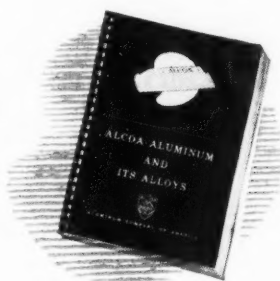
Alcoa Aluminum 61S-T6, for example, has excellent resistance to corrosion by coal dust and mine waters. It has high strength . . . 40,000 p.s.i. typical yield. It's made in standard structural shapes and in plate gages. Easy to fabricate with standard tools.

The light weight of aluminum . . . $\frac{1}{3}$ as heavy as steel . . . lets you cut the weight of structures and still maintain high strength. The light weight of aluminum members makes them easy and fast to handle in the shop.

Although aluminum is not immediately available from all sources, now is the time to do your planning and designing. Now is the time to put your weightsaving problems on the board.

Engineering data and design information will be sent to you on request. ALUMINUM COMPANY OF AMERICA, 1763 Gulf Bldg., Pittsburgh 19, Pa. Sales offices in 54 leading cities.

The new, revised booklet "Alcoa Aluminum and Its Alloys" will be sent to you promptly on request.



ALCOA FIRST IN ALUMINUM



News Round-Up



New Contracts Boost Wages, Welfare Fund; "Captive" Mines Refuse Union-Shop Clause

Bituminous and anthracite miners went back to work at the end of their vacation period July 6 under new contracts granting a wage increase of \$1 a day and doubling the welfare-fund levy on tonnage to 20c. The only hold-outs in the general back-to-work movement were 40,000 miners in "captive" operations, who were joined by sympathizers in some commercial mines in western Pennsylvania and northern West Virginia.

Bituminous commercial operators signed the new wage agreement June 25 and anthracite operators announced their new agreement with the union July 4. However, operators of "captive" mines, pointing out that acceptance of the union-shop clause would put them in violation of the Taft-Hartley Act, refused to go along on the new bituminous contract and filed an unfair-labor-practice complaint against Mr. Lewis and the union with Robert N. Denham, general counsel, National Labor Relations Board.

The new bituminous agreement, marking a complete victory for Mr. Lewis and the union, was reached at the end of a series of stormy bargaining sessions interrupted by deadlocks and court decisions. During the last several days before agreement was reached, a Presidential fact-finding board stood on the sidelines and heard step-by-step progress reports on negotiations. The board was named June 19 as President Truman's first step in forestalling a stoppage that seemed likely to develop at the end of the miners' vacation period.

After Judge T. Alan Goldsborough on June 4 ordered Mr. Lewis to bargain with the Southern Coal Producers Association, talks were resumed until June 15, when northern and western operators walked out of the conference in objection to Mr. Lewis' continued insistence that they activate the 1947 pension fund before talking terms of the new contract. Southern operators reserved the right to talk separately with the union. Meanwhile, the operators on June 9 had submitted an offer to the union including a plan for the 1948 welfare fund, which they proposed to recommend to their fund trustee as a pattern for the 1947 fund. The operators'

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plan would have paid 65-year-old miners with 20 years' service a monthly pension of \$100, inclusive of old-age and social-security benefits, if they were employed by signatories to the agreement, and would have allocated certain percentages of the welfare fund to the several purposes of the fund. In addition, the operators asked for abolition of the "able and willing" clause, stricter terms for the memorial-period clause, revision of midweek layoff rules, abandonment of double pay for the seventh consecutive day of work and no wage increase. They asked also that miners continue at work under terms of the 1947 agreement pending negotiation of the new contract. Mr. Lewis, on the other hand, took the position that the 1947 fund must be activated and that miners should continue at work after their vacation only if the new contract was made retroactive to July 1.

On June 16, Ezra Van Horn, operators' trustee of the 1947 fund, filed suit in Judge Goldsborough's court to block payments from the welfare fund and require Mr. Lewis and Senator Bridges, neutral trustee, to negotiate with him a detailed, written basis for payment of pensions. This suit was in addition to an earlier court action by Mr. Van Horn that had frozen the fund. Judge Goldsborough held hearings on Mr. Van Horn's complaint on June 19 and, on June 22, cleared the way for renewed wage talks by ruling (1) that a majority of the trustees could activate the fund and (2) that, since the contract was between operators and the union and not between operators and their employees, the Bridges plan was consistent with the Taft-Hartley Act and the 1947 wage agreement. After the court's ruling,

Mr. Van Horn withdrew his other pending suits. Six days later, on June 28, welfare-fund trustees met in Washington, D. C., to begin writing a detailed plan for administering and disbursing the 1947 fund under the Bridges plan, which calls for monthly \$100 payments to 62-year-old miners with 20 years' service who retired after May 28, 1946.

Talks between the operators and the union were resumed almost immediately after Judge Goldsborough's ruling on June 22 and, after day-and-night sessions with frequent progress reports to the Presidential fact-finding board, terms of the new contract were announced June 24, enabling the board to report to President Truman on June 26 that the national health and safety were not endangered.

Terms of the new contracts in anthracite and bituminous, in addition to raising the basic day rate from \$13.05 to \$14.05 and the welfare-fund levy from 10c. to 20c., carry over provisions of the 1947 agreement on hours and working conditions, the "able and willing" clause, vacations and vacation payments, the memorial-period clause, the union-shop clause and the several provisions for overtime payments. Much the same agreement later was reached jointly by the Illinois Coal Operators Association and the Progressive Mine Workers. Official sources estimate that the new contract probably will push bituminous retail prices up 40c. to 50c. per ton; anthracite, about 80c.

Following the signing of the new agreement, bituminous operators and the union issued a joint statement including the following paragraphs:

"In the interest of promoting harmony in the bituminous coal industry and to cause a cessation of the constant bickering that has beset the industry during the past year, the committee deems the agreement to be a respectable and reasonable one. No matter what the feelings of either side were about the law and the fund, they have decided to cooperate with each other so far as they can in operating it successfully.

"The new agreement is predicated upon the restoration of normal business-like relationship between the operators and the mine workers. Each side expressed a desire to bring about harmony and understanding between labor and management in the industry. As far as it was possible, the parties agreed to cease public denunciation of each other.

"The bituminous coal industry is basically essential to the maintenance of this country's economy. Its labor is the most productive in the world . . . The mine workers and the operators have pledged to each other to continue the policy of increasing production per man-day and the development and application of machinery and power as rapidly as possible."

1948 Bituminous Wage Agreement

This Agreement, made this 25th day of June, 1948, by and between the coal operators and associations signatory hereto, hereinafter referred to as Operators, parties of the first part, and the International Union, United Mine Workers of America, hereinafter referred to as Mine Workers, on behalf of each member thereof, party of the second part, covering all of the bituminous coal mines owned or operated by said first parties, amends, modifies and supplements previous agreements as herein provided. This Agreement (subject to the amendments, modifications and supplements as hereinafter provided) carries forward and preserves the terms and conditions of the Appalachian Joint Wage Agreement (dated June 19, 1941), effective April 1, 1941, to March 31, 1943, the Supplemental Six-Day Work Week Agreement, the National Bituminous Coal Wage Agreement (dated April 11, 1945), effective April 1, 1945, the National Bituminous Coal Wage Agreement of 1947 (dated July 8, 1947), effective July 1, 1947, and all the various District Agreements executed between the United Mine Workers of America and the various Operators and Coal Associations (based upon the afore-said basic agreements) as they existed June 30, 1948, subject to the terms and conditions of this Agreement and as amended, modified and supplemented by this Agreement as herein set out.

Welfare and Retirement Fund—During the life of this Agreement, there shall be paid into such Fund by each Operator signatory hereto the sum of 20c. per ton of 2,000 lb. on each ton of coal produced for use or for sale.

The obligation to make payments to the "United Mine Workers of America Welfare and Retirement Fund" under this contract shall become effective on July 1, 1948, and the first actual payments are to be made on August 20, 1948, and thereafter continuously on the 20th day of each succeeding calendar month covering the production of all coal for use or sale during the preceding month.

Wages and hours—Amend Section 1(d) of the National Bituminous Coal Wage Agreement of 1947 so as to read as follows:

"(d) All mine workers, whether employed by the month, day, or ton-

nage, yardage, deadwork or footage rate, shall receive \$4.05 per day in addition to that provided for in the contract which expired March 31, 1946."

Vacation payment—Amend "Vacation Payment" section of the National Coal Wage Agreement of 1947 as follows, to wit:

1. In the first paragraph strike out the words "Saturday, June 26, 1948, to Monday, July 5, 1948, inclusive" and insert in lieu thereof the words "Saturday, June 25, 1949, to Monday, July 4, 1949, inclusive."

2. In the second paragraph, strike out "(June 1, 1947, to May 31, 1948)" and insert in lieu thereof "(June 1, 1948, to May 31, 1949)."

3. In the second paragraph strike out "March 31, 1947" and insert in lieu thereof "March 31, 1948."

4. Amend the fifth paragraph by striking out "1948" and inserting in lieu thereof "1949."

Termination of Agreement—This Agreement dated June 25, 1948, shall be effective as of July 1, 1948, and shall terminate June 30, 1949;

Provided, however, that either the "Parties of the First Part" or "Party of the Second Part" may terminate this Agreement on any earlier date by giving at least 30 days' written notice to the other party of such desired earlier termination date.

The foregoing termination provision shall not be construed to limit or affect in any way the obligations of the parties relating to the termination of contracts under the "Labor-Management Relations Act, 1947."

Integrated instrument—This Agreement is an integrated instrument and its respective provisions are interdependent and shall be effective from and after July 1, 1948.

In witness whereof, each of the parties signatory hereto, pursuant to proper authority, has caused this Agreement to be signed by its proper officers or representatives at Washington, D.C., on this the 25th day of June, A.D., 1948.

New Wrinkle in Tax Law: Levy on Strip Machines

Extending the list of objects and activities taxable under Pennsylvania's 1947 statute, the Hazle Township School Board has disclosed plans to impose a tax on stripping machinery based on cubic-yard capacity or horsepower of machines "such as dig and transport earth, rock and minerals by operation on the surface." The levy would amount to an annual tax of \$100 per cubic yard capacity of shovels and draglines and \$1 per rated horsepower of bulldozers and other earth-moving equipment. A state law passed by the 1947 legislature permits local political subdivisions to tax anything not already taxed by the state.

Elsewhere, the Port Vue council

has enacted a 35c.-per-ton tax on every ton of coal mined in the borough, directly affecting new stripping operations in McClure's Field. There was some possibility that a later meeting of the borough council might revise the amount of the tax downward. Meanwhile, in Clearfield, Judge F. Cortez Bell upheld the 5c.-per-ton tax enacted last fall by Lawrence Township. Local operators gave notice of appeal to the state Supreme Court.

Coal operators meanwhile protested the scope of the 1947 act. In Philipsburg, June 22, central Pennsylvania strip operators cited "gross taxation inequalities" growing out of the statute and urged that the state assume a larger portion of local financing for education.

Contract Signed for Second Gasification Test

Approval of a contract between the U. S. Bureau of Mines and the Alabama Power Co. for a second and larger cooperative experiment in underground coal gasification at Gorgas, Ala. (*Coal Age*, March, p. 130), was announced June 22 by James Boyd, director of the Bureau. Preparation of the site is expected to be completed by next fall, and interested persons will be invited at that time to inspect the underground working before the coal bed is fired for the first experimental run, Mr. Boyd said.

Cost of the test is estimated at \$411,000 for a one-year period. Under the contract, the Alabama Power Co. will provide engineering and operating services on a cost basis, without profit, and will contribute as a site for the experiment some 300 acres of Pratt-seam coal averaging 40 in. in thickness. Preliminary core drilling already is in progress to determine the composition of the ground overlying the coal, which ranges from 60 to 125 ft. in depth.

Coal Leaders to Address Summer Mining Sessions

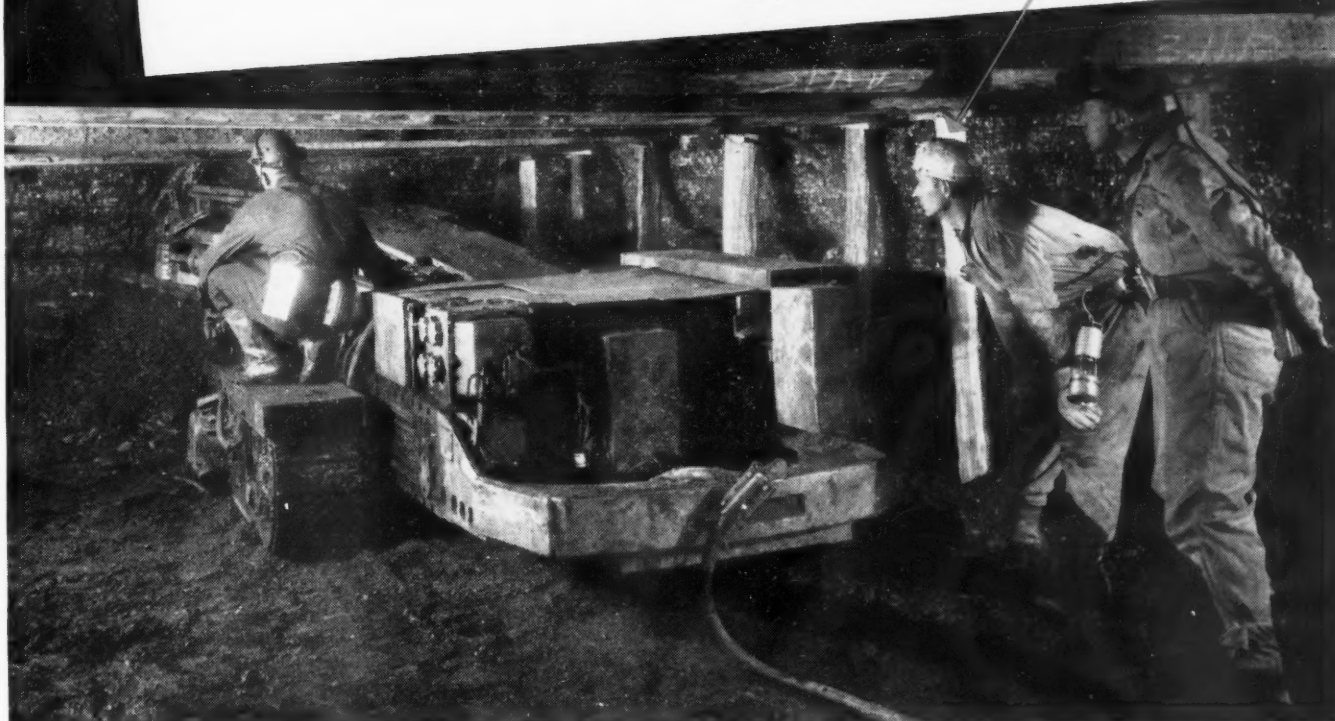
A series of weekly talks by men prominent in the coal industry and open to interested mining men and the general public will be a feature of the Summer Mining Sessions beginning June 28 at Saint Francis College, Loretto, Pa., according to a statement by Charles O'Neill, president of The Central Pennsylvania Coal Producers' Association, which organization was instrumental in establishing the project at the college last year. The classes will continue for six weeks, closing on Saturday, August 7.

The sessions, extending over a three-year period, offer training to interested mining men in preparing them for placement in responsible positions in the mining industry with a minimum of schooling. The success of

"with **Gulf Mining Machine Lubricant B**

we stopped transmission
bearing and gear failures"

says this Mine Foreman



The Foreman of this progressive mine (second from right) gives credit to Gulf Mining Machine Lubricant B for improved lubrication of cutting machines and a sharp reduction in maintenance costs. The Gulf Lubrication Engineer in the picture (right) recommended the application of this quality lubricant.

"MAINTENANCE of cutting machine transmissions was a tough problem before we changed to Gulf Mining Lubricant B," says this Mine Foreman. "Throwoff and channeling of the greases we had been using often resulted in failure of gears and bearings."

"But that's not the case anymore! With Gulf Mining Machine Lubricant B we eliminated this big expense. No more channeling and throwoff, no excessive wear of gears and bearings—this quality lubricant stays on, and provides efficient lubrication."

Call in a Gulf Lubrication Engineer today and ask him to demonstrate the many advantages of Gulf Mining Machine Lubricant B for your ma-

chines. He will show you how it can effectively help you make important savings in maintenance costs — and at the same time simplify lubricant storage and handling by reducing the number of lubricants needed. Write, wire, or phone your nearest Gulf office.

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the undertaking is demonstrated by the interest shown by the students who attended the sessions last summer, practically all of whom are returning for this year's sessions.

The series of Saturday morning meetings at which prominent mining men will discuss various problems affecting the industry will be attended by the student personnel enrolled and interested mining men and also will be open to the general public. A distinctive and important program has been arranged. The talks, which will begin at 9 o'clock, will be followed by a discussion until noon, in which the audience will participate.

The speakers and their topics scheduled for these discussions are July 10, J. D. A. Morrow, president, Joy Mfg. Co., "Mechanization in Coal Mining"; July 17, George A. Lamb, Pittsburgh-Consolidation Coal Co., "Economics of Coal"; July 24, Andrew B. Crichton, president, Johnstown Coal & Coke Co., "Need for a Reappraisal of Our Coal Reserves"; July 31, Joseph T. Pisula, assistant general superintendent, H. C. Frick Coke Co., "Problems of Safety in Coal Mining"; and Aug. 7, Charles O'Neill, "Labor Relations in Coal Mines."

Miners' Trial to Start; Other Strife Reported

Trial of 178 Buchanan County, Virginia, miners charged with violation of the State's anti-lynch law was scheduled to begin July 12, with J. Lindsay Almond Jr., state attorney general, planning to take personal charge of the prosecution in accordance with a directive issued by Gov. Tuck June 11. The indictments are based on the assault last April on R. L. Gilliam, one of the operators of the Gilliam & Hodgins strip mine, when assertedly union miners attempted to block work at the mine.

Indictment of each of 178 men on 10 counts was voted by the Buchanan grand jury, after the disturbance had been investigated by the state police. Gov. Tuck, in a letter to the attorney general June 11, criticized local law enforcement in the county and directed him to take personal charge of the prosecution. Additional state police reportedly have been transferred into the state's coal-mining regions in recent weeks.

An assault June 27 on a Virginia state trooper in Wise County was reported to have stemmed from growing tension in the area between union miners and operators of non-union truck mines. The trooper was attacked without warning by five men stopped on the road, knocked momentarily unconscious and thrown down a bank. Two shots were fired at him with his own gun, but he quickly recovered and joined in the search for the men. Four of the five men jailed for the assault were reported to be miners.

At Kingwood, W. Va., 12 members

EQUIPMENT APPROVALS

Four approvals of permissible equipment were issued by the U. S. Bureau of Mines in May, as follows:

Joy Mfg. Co.—Type T2C-5APE/F machinery-moving truck; two 4-hp. motors, each 250 and 500 volts, d.c.; Approvals Nos. 2-619 and 2-619A, respectively; May 4.

Joy Mfg. Co.—Type 8BU-13LKK rock loader; 15-hp. a.c. motor, 550 volts, 50 cycles; Approval No. 2-620A; May 14.

Jeffrey Mfg. Co.—Type 61-CLR loading machine; rubber-tired mounting; 18-hp. motor, 250 and 500 volts, d.c.; Approvals Nos. 2-621 and 2-621A; May 20.

Lennan Lights, Inc.—Model K2 flash-light; two-cell, prefocus, neoprene casing; Approval No. 612; May 28.

of a reported "roving picket band" were fined June 29 \$75 and costs as a result of a flareup between pickets and a non-union mine operator during the stoppage last spring. The men had been charged with conspiracy "to inflict punishment and bodily injury" on Raymond Hartman, operator of a mine near Kingwood, and A. T. Tichnell, one of his employees. The mine had continued to operate after the union miners had quit their jobs. The men pleaded guilty to lighter misdemeanor charges and trial on the felony charges was waived.

In Lexington, Ky., two Harlan County miners filed suit June 5 in Federal District Court for damages of \$25,750 each from the U.M.W.A., charging they were beaten and threatened for refusing to stop work at the Woods mine of the Harlan-Wallins Coal Corp. during the stoppage last spring. The men May 22 filed petitions with the NLRB, charging the union with unfair labor practices under the Taft-Hartley law.

Earlier in June, about 425 miners at three mines of the Harlan-Wallins Coal Co. reportedly walked out in protest at the employment of W. D. Cohelia as superintendent at the company's Verda operations. While on his way to work, Mr. Cohelia was attacked near his home by a group of 15 men who warned him to stay away from the mine. The men were driven off by shots by Mrs. Cohelia and their son, who were watching from the house. Mr. Cohelia continued to report for work and the miners returned to work after several days.

Plan First Aid Contests For Anthracite Region

The first region-wide first-aid competition in the anthracite industry since 1941 was scheduled to get under way late in July when 14 teams of the Hudson Coal Co. were to partici-

pate in the first of six district contests. The teams taking the top three places in each of the six district meets will be eligible for a championship contest to be held in Kingston Sept. 11.

The other preliminary meets are: Aug. 7, at Lakewood Park, near Mahanoy City, 22 teams of the southern independent operators; Aug. 14, at Lakewood Park, 16 teams of P. & R. C. & I. Co.; Aug. 21, at the Lansford baseball park, 24 teams of the Lehigh Navigation Coal Co., Inc.; Aug. 21, Carbondale baseball park, 15 teams of the northern independent operators; Aug. 28, Sans Souci Park, 16 teams of the Lehigh Valley Coal Co.

Company Scholarship Awarded Miner's Son

Award of the first of two \$500 annual scholarships for study of mining engineering established earlier this year by the Johnstown Coal & Coke Corp. was announced last month by Andrew B. Crichton Sr., president of the company. The winner, Robert B. Bakale, 21, who ranked first among five applicants in a competitive examination prepared by Pennsylvania State College, is the son of Robert Bakale, employed since 1936 as a miner at the company's Portage No. 4 mine. Robert was graduated from the Portage Borough High School in 1946 with a high scholarship record and for the past year has been employed by the company in the engineer's office at Miller Shaft.

The scholarship covers four years of study at \$500 yearly, dependent on the continuation of satisfactory marks from year to year. For the first two years, Robert will be enrolled at the Johnstown Center of the University of Pittsburgh. The second scholarship, planned by the company for an employee or son of an employee at its West Virginia operations, has not as yet been awarded.

New River Institute Sees D.C. Motor Tests

Direct-current motors offer the best results when brushes have been set to neutral by the accurate means of a reversing speed test at light load, explained W. E. Wolfe, shop superintendent, National Electric Coil Co., Bluefield, W. Va., in a talk and demonstration at an evening meeting of the New River & Winding Gulf Electrical & Mechanical Institute held at Beckley, W. Va., June 10. Because a closely regulated voltage supply is required for such a test it is feasible only in a repair shop that has adequate equipment, Mr. Wolfe pointed out. In the field, the test with a millivoltmeter contacting the commutator bars while the fields are flashed remains the most practical.

The first part of the session was held in the Raleigh County Soldiers &



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EAST ST. LOUIS, ILLINOIS

Sailors Memorial Building. At the invitation of E. A. Rickard, purchasing agent, The New River Co., and president of the institute, Ralph Hughes, sales manager, Bluefield branch of the National Coal Co., introduced Mr. Wolfe, who has spent many years in coal mining and for some time was chief electrician of the Clinchfield Coal Corp., Dante, Va. He emphasized that better maintenance has become a necessity as a result of the increased use of electrical equipment and changed conditions.

Actual demonstrations of motor tests on a dynamometer and a demonstration on a small motor balancing machine constituted the second part of the session held in the garage of the Appalachian Electric Power Co. close to the memorial building. The dynamometer and balancer were brought from Bluefield for the occasion.

With a compound-wound motor, Mr. Wolfe demonstrated the setting of brushes by using the shunt fields only, with the motor operating at equal speeds in both directions, and with voltage constant, of course. Then, with loads applied he demonstrated normal operation, followed by the sparking, speed variations and other reactions resulting from the brushes off neutral and from these various incorrect connections: (1) top commutating field reversed, normal rotation; (2) top commutating field reversed, reversed rotation; (3) both commutating fields reversed; (4) both commutating fields cut out; (5) series field cut out; (6) series field reversed (dangerous); (7) one shunt field cut out; and (8) one shunt field reversed.

A steel roller with periphery slots into which wedges of different weights were inserted was employed to demonstrate the balancing machine. Equal weights added to opposite sides at each end put the roller into perfect static balance but caused bad vibration at speed. By a few trials and proper use of the gages and indicating lights, the roller was put in both static and dynamic balance. Critical speeds were demonstrated and it was explained that the balancing should be perfected to a degree that brings the critical speed above the operating speed.

New Developments

- Leasing of 25,000 acres of coal lands on Spring Fork of Quicksand Creek, in Breathitt County, Kentucky, and plans for its development, were announced late last month by James D. Francis, president, Pond Creek Poca-hontas Co. Approximately 42,000,000 tons of recoverable coal in the Elkhorn No. 3 seam is contained in 12,500 acres of the property. Plans are being made to install on the property a modern completely mechanized mine and a complete preparation plant, with a capacity of 1¼ to 1½ million tons per year.

The property also contains 5,000,000

tons of high-grade steam and domestic coal, which will be recovered by stripping and prepared at a separate plant with a capacity of 750,000 tons yearly. Additional stripping tonnage is expected to be available on or adjacent to the property. The company also holds a 10-year option on 42 million tons of coal in the Elkhorn No. 3½ seam under the property, which is available for future development.

To provide service for the new development, the C. & O. is applying to the ICC for authority to build 15 miles of track into the center of the area. Development of the area is scheduled to begin as soon as railroad facilities are available.

- Gibraltar Collieries, a subsidiary of Ayrshire Collieries Corp., Indianapolis, has acquired the Old Black Gem property operated by the former Rogers Bros. Coal Co. near Bevier, Muhlenberg County, Ky. Production of the strip mine, now averaging about 25,000 tons a month, is to be doubled by the new owners, with installation of new and larger equipment. Life of the property is estimated at 20 years.

- Plans by the Peabody Coal Co., Chicago, for the opening of a new 4,000-tons-a-day slope mine near Harco, Ill., were reported last month. Development of the new \$2,000,000 operation, which is expected to be similar to the company's new mine recently opened at Harrisburg, is to begin this summer. A third new operation, previously announced, is being opened near Pana.

- Plans reported for a new mine of the Philadelphia & Reading Coal & Iron Co. at Porter Tunnel, near Tower City, Pa., are still "in the consideration stage" and a final decision on its development is yet to be made by the company, according to a recent announcement by Edward A. Lynch, personnel director. Exploration indicates about 10,000,000 tons of coal available, and an operation with a potential capacity of over 2,000 tons daily is being considered.

- Sale of the Hamill Coal Co., with operations in Buchanan County, Virginia, to the Correale interests of Hazleton, Pa., was announced last month by C. A. Hamill, of Huntington, W. Va.

- The Pittston Co. has leased the Wyco mine of the Gulf Smokeless Coal Co. in Wyoming County, West Virginia, including approximately 3,000 acres of coal land. The mine, which produces about 1,100 tons daily, will be operated as the Wyco mine of the E. C. Minter Coal Co., recently acquired by The Pittston Co.

- The Red Parrot Coal Co., Prenter, W. Va., is reportedly planning the opening of a new mine in the Dorothy seam, to produce 1,000 tons daily.

- Smith & Stokes Mining Co., Madisonville, Ky., has sold its strip operation southeast of Madisonville to the Ruby Construction Co. of Madison-

ville. No change is expected in personnel at the mine, which produces 175 cars of coal daily.

- Saxton Coal Co., Jellico, Tenn., was reportedly planning to open about July 15 a new strip mine, to be known as Saxton No. 2, at Clearfield, Tenn.

- Kentucky Eastern Coal Co., Inc., West Liberty, Ky., has acquired 3,600 acres of coal land in Morgan County. Stripping operations in the No. 9 seam were scheduled to begin about July 1, with about 8,000,000 tons available for stripping. The Elkhorn No. 3 and No. 9 seams are to be deep-mined.

Mines Bureau to Expand Anthracite Activities

With an appropriation of \$396,100 from Congress, the U. S. Bureau of Mines is planning to expand its activities in the Pennsylvania anthracite region during the fiscal year 1949, with the greatest emphasis on the development of methods for the elimination of the region's mine-water problems.

Flood-control projects alone call for the expenditure of \$291,100, provided by Congress in a supplemental appropriation. The remaining funds will be spent to continue work on the conservation of anthracite reserves, more efficient mining and preparation methods, wider use of different sizes of anthracite and increased use of mechanical-mining methods. Further enlargement of the Bureau's work in the anthracite region is predicted when the new \$450,000 research laboratory at Schuylkill Haven, Pa., is completed next spring.

Contracts Awarded for Schuylkill River Work

Contracts for the clean-up of the Schuylkill River, totaling nearly \$5,000,000, have been awarded by the Commonwealth of Pennsylvania. Preliminary work was to be started immediately, with actual dredging for culm and silt from the river expected to begin about July 20, according to M. F. Draemel, state secretary of forests and waters. The contracts awarded were:

Dredging of a 21-mile section of the Schuylkill River north of Reading, Eastern Engineering Co., Atlantic City, N. J., \$2,482,200.

Construction of the Kernsville Dam at the junction of the Schuylkill River and Little Schuylkill River, Poirier McLane Corp., New York City, \$2,199,730.

Construction of an impounding basin at Riverside, near Shepps Dam, two miles above Reading, J. P. Leaming of Wyncote, \$196,391.

The Kernsville Dam will provide a still water pool in which the coal silt can settle for removal at a later date. The 21-mile stretch of the river below it contains an estimated 4,330,000 cu. yd. of culm which will be removed.

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COAL**

TIME OF SAMPLING	SIZES							
	3½" x 2"		2" x ¾"		¾" x ¾"		3" x ¾"	
	FLOATS	SINKS	FLOATS	SINKS	FLOATS	SINKS	FLOATS	SINKS
	%	%	%	%	%	%	%	%
9.00AM	99.9	0.1	99.7	0.3	99.4	0.6	99.5	0.5
10.00 "	99.6	0.4	99.3	0.7	99.6	0.4	99.5	0.5
11.00 "	99.6	0.4	99.4	0.6	99.4	0.6	99.5	0.5
12.30PM	100.0	0.0	99.6	0.4	99.8	0.2	99.8	0.2
1.30 "	99.9	0.1	99.8	0.2	100.0	0.0	99.9	0.1
2.30 "	99.9	0.1	99.8	0.2	100.0	0.0	99.9	0.1
AVERAGE	99.8	0.2	99.6	0.4	99.7	0.3	99.7	0.3

¾" x ¾" SIZE
REFUSE SINK & FLOAT TEST AT 1.45
SPECIFIC GRAVITY

REFUSE

TIME OF SAMPLING	FLOATS	SINKS
	%	%
8.45 AM	0.0	100.0
9.30 "	0.3	99.7
10.45 "	0.5	99.5
11.45 "	0.6	99.4
1.05 PM	0.1	99.9
2.10 "	0.1	99.9
3.00 "	0.3	99.7
AVERAGE	0.3	99.7



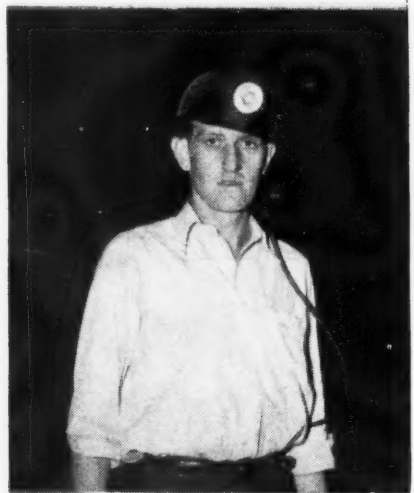
THE HEART OF THE PREPARATION PLANT

United Engineers & Constructors Inc

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K. M. Marquis, president, W. H. Warner & Co., Inc., Whitney Warner Jr., president, Warner Collieries Co., W. F. Wolfe, vice president, Leonard Brooks, superintendent, Hurricane mines, Lee Morris, assistant to the president, and E. B. Hall, personnel director.



B. H. Elliott, assistant mining engineer, New Jellico Coal Co., Morley, Tenn.

COAL MEN



Left to right—Floyd Posey, tipple foreman, and W. L. Shipwash, chief electrician, Diamond No. 3 mine, Diamond Coal Mining Co., Caryville, Tenn.; O. C. Mayes, bookkeeper, Moore Coal Co., Devonia, Tenn.; and J. F. Edgil, chief electrician, Summit mine, Alta Coal Division, Southern Cotton Oil Co., Sumiton, Ala.



Raleigh Bedell (left), and Clem Henderson, pit bosses, and Donald Saxton, superintendent, Georgetown No. 12 mine, Hanna Coal Co., St. Clairsville, Ohio.



Reuben Mize (left), district foreman, Marshall Ware, district foreman, and Gordon Key, mine foreman, night shift, Praco mine, Alabama By-Products Corp., Praco, Ala.



C. A. Kelly, superintendent, Colonial Coal Mining Co., Madisonville, Ky.

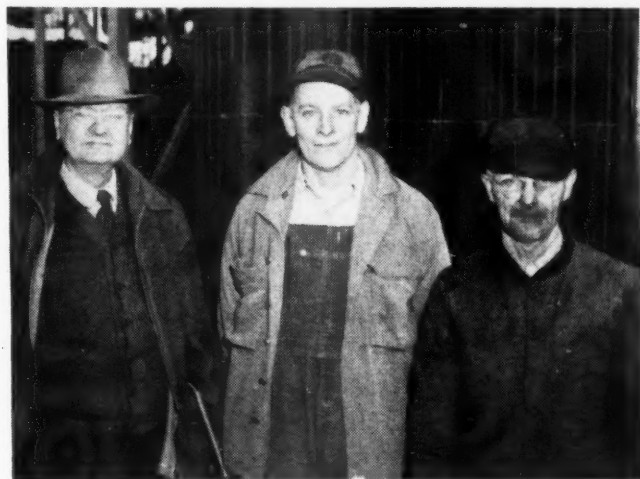


Charles Lillich (left), section foreman, J. D. Blackwell, district foreman, Melvin Collier, H. G. Hubbert, and J. A. Sexton, section foremen, day shift, Praco mine, Alabama By-Products Corp, Praco, Ala.

ON THE JOB



Left to right—Lawrence Freeman, mine foreman, night shift, Regal mine, Southern Collieries, Inc., Lake City, Tenn.; R. G. Brown, chief bookkeeper, and A. B. Stott, office manager, Fork Mountain Coal Co., Fork Mountain, Tenn.; and H. J. McGhee, tippie foreman, Rose-dale mine, Diamond Coal Mining Co., Devonia, Tenn.



Ray Baughman (left), general superintendent of preparation and construction, Clyde Rhodocker, assistant tippie foreman, and Homer Miller, tippie foreman, Central Indiana Coal Co., Linton, Ind.



Lee W. Matthews (left), day foreman, A. R. McDonald, second-shift foreman, and Carl Rogers, shop superintendent, Georgetown No. 12 mine, Hanna Coal Co., St. Clairsville, Ohio.

Personal Notes

J. N. Geyer has been appointed production engineer, Imperial Coal Corp., with headquarters in Johnstown, Pa., according to an announcement by Charles A. Owen, president of the company. Mr. Geyer has been associated with the Central Pennsylvania Coal Producers' Association for the past 15 years, serving as mining engineer, technical adviser and most recently as assistant secretary. During the war, he was on leave of absence to serve as Area Distribution Manager, District No. 1, SFAW. Before joining the Association, he was with the U. S. Bureau of Mines as a mining engineer.

M. M. Watson, for the past 15 years superintendent of the Frederick mine of the Colorado Fuel & Iron Corp., Valdez, Colo., was planning to retire last month. Mr. Watson, who served the company as a mine official in other districts before coming to Valdez, was to be honored at a party attended by company and union officials and his associates.

A. D. Sisk, secretary-treasurer, Big Sandy-Elkhorn Coal Mining Institute, Pikeville, Ky., has been appointed chief, Kentucky Department of Mines and Minerals, with headquarters at Lexington, to replace Harry Thomas, resigned. Mr. Sisk, who has been active in the Big Sandy-Elkhorn Institute for some years, is well known throughout the state for his interest in and development of mine safety. A. O. DeMoss, formerly state district mine inspector in the Earlington section, has been named assistant chief of the department.

Charles J. Hannigan, formerly superintendent, has been named general superintendent, Sterling Coal Co., Bakerton, Pa., succeeding the late William Lamont. Mr. Hannigan is a veteran of 51 years in the coal industry. Thomas Lamont, formerly safety director, has been appointed assistant superintendent.

John M. Provost, superintendent, Harwick mine, Duquesne Light Co., Harwick, Pa., since 1938, retired recently. Mr. Provost was honored at a dinner May 16, attended by a large number of company officials and his associates. In behalf of the group, George C. Trevor, general superintendent of the coal department, presented Mr. Provost with a combination radio-phonograph and Mrs. Provost with a pressure cooker. Before joining Duquesne Light, Mr. Provost had been associated with the Pittsburgh Coal Co. and the Pittsburgh Terminal Coal Co. in engineering and operating capacities.

Acel Garland, formerly associated with the engineering department of T. C. I. & R.R. Co., Birmingham, Ala., has joined the Island Creek Coal Co.,



GEORGE DEIKE (right), president, Mine Safety Appliances Co., Pittsburgh, and his son, George Deike, Jr., chief engineer of the company, have been awarded graduate degrees of Engineer of Mines by Pennsylvania State College for their theses on the coal industry. Mr. Deike Sr.'s subject was the history of the fatality record in coal mines of this country from 1900 to 1906. That of his son was the history of rock-dust machinery in coal mines of this country from 1926 to 1948. Mr. Deike Sr., who is one of the founders of the company, was graduated from Penn State in 1903; his son in 1931.

Holden W. Va., as director of industrial engineering.

West Virginia Coal & Coke Corp., Omar, W. Va., has announced several changes in supervisory officials. W. S. Palmer, superintendent, Mine No. 15, has been transferred to superintendent, Mine No. 19, replacing J. A. Sarsfield, resigned. Thomas H. Childers, superintendent, Mine No. 5, has been transferred to succeed Mr. Palmer as superintendent of No. 15. At Mine No. 5, Orville Steele, general mine foreman, has been named superintendent to succeed Mr. Childers. Flody G. Varney, formerly general night foreman, has been promoted to general mine foreman and is succeeded by Wandel Rhodes, formerly general assistant mine foreman. Gene Jordan, section foreman, has been made general assistant foreman of the day shift at No. 5 and John Thern has been appointed section foreman at that mine. Virgil Thatcher has been appointed dispatcher at the company's No. 4 mine. Jake Stewart, formerly at No. 5 mine, has been made a foreman in charge of a portion of the underground construction at Mine No. 15. Matthew Dameron has been appointed section foreman at Mine No. 15.

Hubert E. Howard Sr., president, Pyramid Coal Corp. and Binkley Coal Co., Chicago, has been elected chairman of the boards of the two companies. R. E. Snoberger, executive vice president, has been elected president of the companies, to succeed Mr. Howard, effective Aug. 1. Mr. Howard, who was one of its founders, has been associated with the Binkley Coal Co. for more than 25 years, as president for most of that time. He has been a

member of the Operators' Wage Negotiating Committee for the past several years. Mr. Snoberger has been prominent in the industry for some years, having been chairman of the Indiana District Board and active in other industry affairs.

G. W. Grundy has been named superintendent of Kent No. 7 mine of the Rochester & Pittsburgh Coal Co., Indiana, Pa. Don R. Haake has been appointed superintendent of the company's Renglo mine and Robert Muir has been made safety director.

Raymond E. Zimmerman, preparation manager, Hanna Coal Co., St. Clairsville, Ohio, has resigned to accept a professorship at Penn State College and will become chief, Mineral Preparation Division, School of Mineral Industries. Prior to the fall term, Mr. Zimmerman is to spend two months in Turkey as a consultant on coal-preparation problems for the Turkish Government.

M. A. DePietro, superintendent of Mine No. 20, and M. R. Barker, superintendent, Mine No. 22, Island Creek Coal Co., have been transferred by the company in a "trade" that puts Mr. DePietro in charge of Mine No. 22 and Mr. Barker in charge of Mine No. 20. J. A. Sarsfield, formerly superintendent, Mine No. 19, West Virginia Coal & Coke Corp., has been named superintendent of Island Creek's Mine No. 1.

George W. Kratz, vice president, Pittsburgh Consolidation Coal Co., has been elected a director of the company, to fill the vacancy created by the recent death of Barton P. Turnbull.

James H. Cunningham, formerly associated with the educational depart-

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A. T. PATTERSON, formerly in charge of purchasing and supply, has been named assistant to the general manager, The Lorado Coal Mining Co., Lorado, W. Va. Under the direction of L. F. Workman, general manager of mines, Mr. Patterson will be in charge of all work above ground. This latest promotion for "Pat," as he is known around the mines, comes at the end of 15 years' service with the company that began with his employment as weighmaster in 1933.



PAUL R. PAULICK, consulting mining engineer, Library, Pa., was scheduled to leave for China early in June. Mr. Paulick, who expects to spend two or three months there, will represent the coal mining division of the Economic Cooperation Administration.

ment of Charles Scribner's Sons, has joined the Bituminous Coal Institute as assistant director of the educational department. Mr. Cunningham will assume management of B.C.I.'s speakers' bureau, to leave Dr. Speare, head of the department, free of that activity, and also will have charge of B.C.I.'s participation in educational and other conventions.

A. L. Kiewit, associated for more than 20 years with the Cincinnati Gas & Electric Co., has been named assistant director of engineering for the Coal Producers Committee for Smoke Abatement.

MEETINGS

- Midwest Stoker Association: annual summer outing and golf tournament, July 30, Hickory Hills Club, Chicago.
- Pocahontas Electrical & Mechanical Institute: Southern Appalachian Industrial Exhibit, August 19-21, Bluefield, W. Va.
- National Association of Foremen: annual convention, Sept. 23-25, Philadelphia Convention Hall, Philadelphia, Pa.
- Illinois Mining Institute: 56th annual meeting, Nov. 5, Hotel Abraham Lincoln, Springfield, Ill.

E. H. Reichl has been named manager of the research department of the research and development division of Pittsburgh Consolidation Coal Co., Library, Pa. Mr. Reichl joined Pittsburgh Consol last January as chief process engineer of the development department.

Appointment of three new district mine inspectors for western Kentucky has been announced by A. D. Sisk, new head of the department, as follows: James H. Phalan, Earlington; Charles Hatfield, Henderson; and Harold D. Ford, Graham.

Mike Sciranko, Benton, Ill., has been appointed an Illinois mine inspector, succeeding Robert Taggart, Farmington, resigned.

Obituary

Moroni Heiner, 71, president, Utah Fuel Co., Salt Lake City, died June 25 at a Salt Lake City hospital after a brief illness. Mr. Heiner, who first became identified with the bituminous coal industry in 1906, was one of the pioneers in its development in Utah and was prominent in the activities of other industries and civic organizations in that state. He was at one time vice president and general manager of the Castle Valley Coal Co. and later was for many years vice president and general manager of the U. S. Fuel Co.

Thomas B. Davis, 72, chairman of the boards of the Island Creek Coal Co. and the Pond Creek Pocahontas Co., died July 3 at the Columbia-Presbyterian Medical Center, New York, after a brief illness. He had been active in business since his graduation from college in 1897. He organized the Consolidated Coal Co., which became the Davis Coal & Coke Co., of which he was formerly president. He became vice president of Island Creek in 1907, president in 1933 and chairman of the board in 1934. He was on the board of the National Coal Association for some years.

Joseph Vlasak Sr., 70, died May 31 at St. Elizabeth's hospital, Belleville, Ill., following an extended illness. Mr. Vlasak, who had been engaged in coal mining for more than 50 years, had

been a mine manager for 27 years, with the Southern Coal, Coke & Mining Co. for 12 years and the St. Louis & O'Fallon Coal Co. for 15 years.

Monro Lemon, 72, president, Primrose Mining Co., Carnegie, Pa., died June 10 at Magee hospital, Pittsburgh.

Charles E. Underwood, 63, superintendent, coke oven division, Bethlehem plant, Bethlehem Steel Co., since 1916, died June 13 at St. Luke's hospital, Bethlehem, Pa. Mr. Underwood, who had been in the coke and gas industry since his graduation from high school in 1901, was widely known throughout the field for his activity and interest in industry affairs.

Association Activities

Indiana Coal Producers Association at a meeting June 3 elected as president, Fred S. McConnell, president, Enos Coal Mining Co., to succeed R. H. Sherwood, president, Sherwood Templeton Coal Co. and Central Coal Co. Officers reelected were: vice president, Hugh B. Lee, vice president and general manager, Maumee Collieries Co.; and secretary, Ernest B. Agee, Terre Haute. Named directors of the association were: Mr. Sherwood; C. M. Smith, secretary-treasurer, G. & F. Coal Corp.; T. C. Mullins, president, Sunlight Coal Co. and Tecumseh Corp.; J. B. F. Melville, vice president and general manager, Ayrshire Collieries Corp.; and V. B. Kibler, treasurer and general manager, Blackfoot Coal & Land Co.

Coal Producers Association of Washington, at its annual meeting in Seattle June 15, elected the following officers: president, Charles F. Larrabee, president, Roslyn Cascade Coal Co.; first vice president, Earl R. McMillan, assistant manager, coal operations, Northwestern Improvement Co.; second vice president, William Strain, owner, Strain Coal Co.; and secretary-treasurer, James E. Ash. Named trustees were: Fred Bianco, Mr. Larrabee, Harry Merbach, Earl Maxwell, David J. Williams, George W. Sheatsley, Mr. McMillan, Mr. Strain, and Thomas Murphy.

Stoker Manufacturers Association, at its 31st annual meeting in Chicago, June 17-18, elected new officers, as follows: president, Claude A. Potts, vice president, U.S. Machine Corp., Lebanon, Ind.; vice president, Howard E. Sill, vice president, Muncie Gear Works, Inc., Muncie, Ind.; secretary-treasurer, C. P. Meredith, vice president, Steel Products Engineering Co., Springfield, Ohio. Elected to the board of directors were: E. M. Clifford, Anchor Division, Stratton & Terstegge Co.; C. T. Burg, Iron Fireman Mfg. Co.; G. W. Graham, Eddy Stoker Corp.; Frank Hoke, Holcomb & Hoke Mfg. Co.; J. M. McClintock, Illinois Iron & Bolt Co.; and Walter Sormane, Conco Engineering Works.



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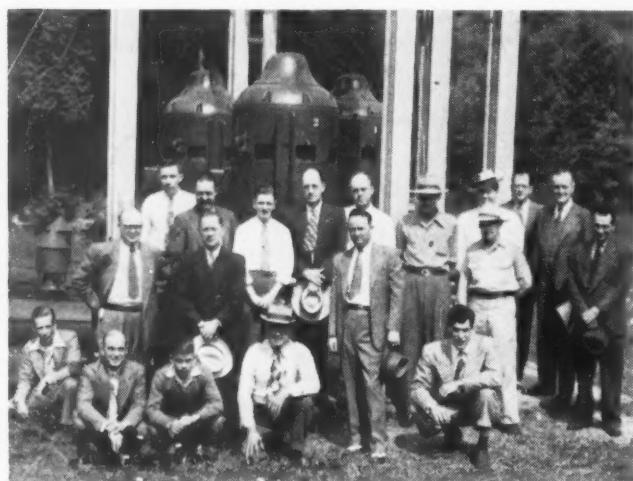
NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION



OFFICIALS AND SPEAKERS at the morning session—Standing: Joseph Bierer (left) and J. R. Blackburn, W. Va. Department of Mines; R. H. Morris, Gauley Mountain Coal Co., and institute president; and A. O'B. Hogue, Princess Dorothy Coal Co., presiding. Seated: John Harsany (left), The New River Co.; Harry Fisher, American Cyanamid Co.; Lloyd G. Fitzgerald, U. S. Bureau of Mines.



PARTICIPANTS in the second session of the West Virginia Institute, Friday afternoon—Standing: J. R. Bourland (left), The New River Co., presiding; and Fred R. Toothman, Chesapeake & Ohio Ry. Co. Seated: Tom Gettings (left), Lorado Coal Mining Co.; S. S. Clark, Gauley Mountain Coal Co.; O. G. Schwant, Hutchinson Coal Co.; and Cadwallader Evans Jr., The Hudson Coal Co.



A FIELD TRIP Saturday morning to the Dry Hill pumping station of The New River Co. discussed the previous afternoon was greatly enjoyed by some of the members (left). Part of the group (right) study the installation while others inspect the nearby electrical-controls house. The station includes three 5,000-g.p.m. pumps, with a fourth to be added soon.

WEST VIRGINIA INSTITUTE OFFERS VARIED PROGRAM

IN COMPARISON WITH other methods of firing explosives, multiple blasting is the safest and most efficient under many conditions, according to several speakers at the Beckley meeting of the West Virginia Coal Mining Institute, held at the Black Knight Country Club, June 11-12. Dewatering in anthracite and bituminous mines, conveyor mining and an analysis of accidents in West Virginia by individual coal seams were subjects of other papers presented.

The meeting was opened by R. H. Morris, vice president, Gauley Mountain Coal Co., and president of the institute. Chairmen of the two technical sessions were: A. O'B. Hogue, vice president, Princess Dorothy Coal Co., and C. R. Bourland, assistant to the vice president, New River Co. At

the luncheon, S. Austin Caperton, president, Slab Fork Co., presided and W. J. Touhy, vice president, C. & O. Ry., was the guest speaker.

At the dinner C. E. Lawall, assistant to the vice president, C. & O. Ry. acted as toastmaster, and Clarence E. Meadows, Governor of West Virginia, spoke on relations between the coal industry and labor. Although he holds no brief for John L. Lewis, one way or the other, Gov. Meadows said, Lewis "has done a mighty lot for the people he represents." Gov. Meadows stressed the changing interpretation of freedom of enterprise over the past 20 years and cautioned that "we can't run our mines as we feel we would like to run them."

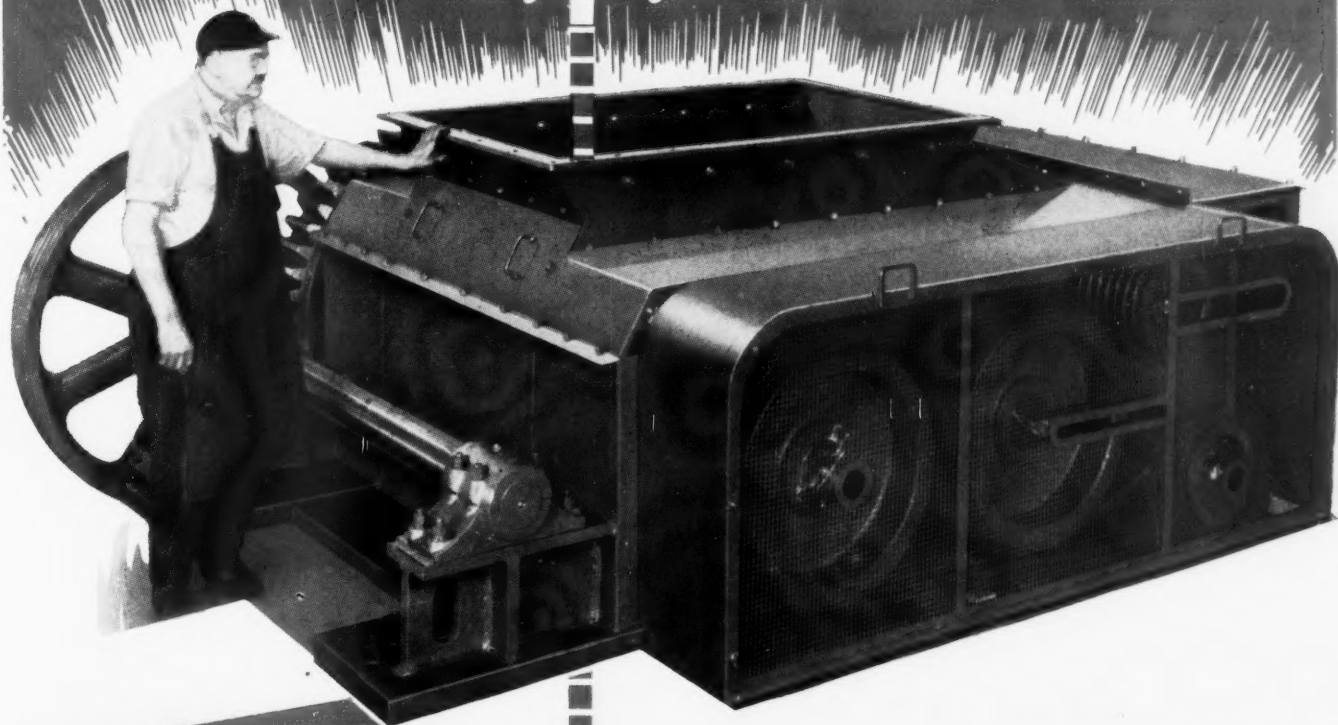
Seven recipients of scholarships offered by the West Virginia Coal

Association were brought to the meeting by Robert Norcross, assistant secretary of the association, and were introduced individually by Dr. Lawall at the dinner. The winners of the \$625 one-year coal association scholarships to study mining engineering at West Virginia University, secured in competitive examinations, were: Daniel Ashcraft, Wheeling; W. J. March, Charleston; Frank DeBolt, Holden; Lewis Kay, Charleston; J. A. Todd, Madison; W. C. Taylor, Richwood and Jack Poundstone, Morgantown. Most of them graduated from high school this year. One or two were already students at the university. Gilbert Davidson, Keystone, the eighth scholarship man, was not present.

On Saturday morning, June 12, Mr. Bourland and C. C. Ballard, electrical

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Birmingham 3	Chicago 1	Denver 2	Newton 5	Milwaukee 11	St. Louis 3
Boston 14	Cincinnati 2	Detroit 12	Washington 10	New York 7	Salt Lake City 1
				Philadelphia 2	San Francisco 2

engineer, New River Co., were hosts on an inspection trip to the New River Co.'s Dry Hill dewatering station, which Mr. Ballard described at Friday's session. Upon registering at the station, guests were given honorary membership cards in the Dry Hill Sportsman's Club and many of them tried their luck in shooting at scrap lamp bulbs tossed into the 15,000-g.p.m. mountain stream created when the pumps were put into operation.

Conclusions on Multiple Blasting

Opening the technical session, Friday morning, Lloyd G. Fitzgerald, mining explosives engineer, U. S. Bureau of Mines, Mt. Hope, outlined the following conclusions in his paper on Multiple Blasting:

"1. The practice of multiple blasting, as would comply with Article IV, Section 5d, of the Federal Mine Safety Code, has not contributed to the injury of any person in any of the mines visited, so far as could be ascertained.

"2. Multiple blasting is more efficient than charging all the boreholes in a face and firing each hole separately.

"3. Less explosives are required where multiple blasting is practiced.

"4. There is less exposure to roof and coal subjected to be loosened by the blast and less exposure to fumes.

"5. Explosives fumes were not excessive.

"6. Multiple blasting should be permitted up to 10 shots unless gas liberation is too great or other factors should introduce hazards because of firing as many as 10 shots at one time.

"7. Copper leg wires should be used and good connections made to reduce the resistance in the blasting circuit.

"8. Batteries (preferably permissible) of ample capacity should be used.

"9. Series of shots in separate benches should not be charged at the same time and then fired together if there is a possibility of the top series covering up a misfired shot in the bottom series, or otherwise preventing the detection of a misfire.

"10. A careful inspection should be made when firing in multiple to discover misfires."

Without naming the operations, Mr. Fitzgerald described multiple blasting and its relative safety in a half dozen mines, mostly in thin coal but including one mine in an 84-in. seam where cutting is done 4 ft. from the floor and above a 27-in. rock parting. In reply to questions by Arthur Belton, Consolidation Coal Co., Fairmont, Mr. Fitzgerald said that multiple shooting seemed to make no more dust than single shooting but that in case of an accidental shooting-through into a parallel or adjoining working place, results would no doubt be more severe than if shots were being fired singly.

In answer to another question, Mr. Fitzgerald stated that in firing shots with the series connection $1\frac{1}{2}$ volts are required per detonator. During the discussion, John Harsany, super-

intendent, Lochgelly mine, New River Co., remarked that the industry lacks "a good rugged shot firing device."

West Virginia began to allow multiple shooting by special permit in 1938, according to a discussion prepared by Arch J. Alexander, chief, West Virginia Department of Mines, and read by Joseph Bierer, administrative assistant. The need for shooting pillars in such a manner that men would not have to go back under tender roof brought up the problem, which was intensified by conveyor mining and the working of low seams. Permits have been granted reluctantly, in case some overlooked hazard should appear.

The permits are granted only in certain cases if: (1) the coal is under 4 ft. thick; (2) places are kept regularly rock-dusted; (3) 6,000 c.f.m. of air is circulated through the place; and (4) there is no shooting of upper and lower benches in the same series electrical circuit. Since these provisions were formulated in 1940, no disastrous results have been evident. Moreover, the state's accident experience on a production basis has been getting better, Mr. Alexander noted.

Mr. Fitzgerald pointed out that some companies object to changing from iron to copper leg wires because the iron wires are separated from the coal by magnets in the preparation plant, while copper wires would not be thus picked out.

E. C. Luther, Jr., general manager, Peerless Coal & Coke Co., Vivian, said that his interests used multiple shooting in 40-in. coal in Kentucky "very successfully."

Multiple shooting begun May 1 in a Kentucky mine has resulted in less smoke and less dust when holes are properly stemmed, less explosive used in top holes, less roof damage if anything, and a great advantage to the shot firemen, according to Harry Fisher, technical and sales representative, American Cyanamid Co., Norton, Va. The seam consists of 27 in. of bottom coal, 12 to 27 in. of parting and 33 to 34 in. of top bench coal, with cutting done in the top bench just above the parting and a very bad top that requires crossbars.

Seven holes in the bottom bench are shot simultaneously, using an 80-volt permissible battery that develops three times the maximum voltage requirement. Iron leg wires and copper lead wires are used and the maximum resistance observed for a seven-shot series has been 27 ohms. The safety post is temporarily removed because it was sometimes knocked out by the shooting and in a few cases it in turn knocked the leg from a crossbar, said Mr. Fisher.

Fewer accidents occur in the thicker seams, as a result of greater freedom of movement, more clearance in haulways and better opportunity to observe roof conditions, were the conclusions offered by Joseph R. Blackburn, engineer, West Virginia Department of Mines, in a statistical study of fatal accidents in different coal seams in the state. From his classi-

fication and tabulation of fatal accidents from 1863 to 1948, tremendous jumps in haulage accidents were evident between the years 1890-95 and again during the period 1920-24. Discussion brought out the apparent reasons—in the first period many electric locomotives were installed for main-line haulage, and in the second, the final change from stock to locomotive gathering was largely completed.

In a graph presented by Mr. Blackburn, West Virginia fatalities from 1883 to the present were divided into four classifications: (1) gas and dust explosions; (2) falls of roof; (3) haulage; and (4) all others. Superimposed over the graph were curves of production and tons per fatality. Strip tonnage and accidents at strip mines are not included.

The tabulation of tons per fatality by seams for 1945 and 1946, while in general indicating better records for the thicker coals, is not consistent. As Mr. Blackburn stated, "There are some seams with better roof or top than others, but for few exceptions, the roof conditions vary in different localities and even in the same mine."

Anthracite Water Problems

"The passing of the years has seen the water problem in the anthracite region increase to such proportions that it is the chief factor that threatens to cut short the ultimate life of the industry and pending the end, to curtail present production," stated Cadwallader Evans Jr., president, Hudson Coal Co., Scranton, Pa., in presenting a slide-illustrated paper, "Water Problems of the Anthracite Region," prepared by H. H. Otto, assistant general manager in charge of engineering, and his assistants, J. T. Griffiths and W. E. Thompson.

For one anthracite company, the tons of water pumped per ton of coal produced increased from 8.4 in 1920 to 43.8 in 1945. The total for 73 anthracite collieries jumped from 21.8 in 1927 to 29.9 in 1935. Abandonment or exhaustion of the mine properties in the northern anthracite field has increased the number of flooded areas from two in 1932 to 26 in 1947. In the four Pennsylvania fields there are today 146 flood pools containing 90,944,000,000 gal., the paper pointed out.

A 22,000-g.p.m. 4,000-hp. "submerged" pumping station is in operation at Marvine colliery of the Hudson Coal Co. The static head has ranged from 452 to 504 ft. and the water in the sump has risen to a maximum of 41 ft. vertically above the pump room floor. The station has four 5,500-g.p.m. 1,000-hp. horizontal centrifugal pumps.

A number of wood and steel flumes have been constructed to carry surface water across areas where it may enter active mines. The largest is the Warrior Run flume, 90 in. in diameter and 3,200 ft. long. An extensive program of surface-prevention measures

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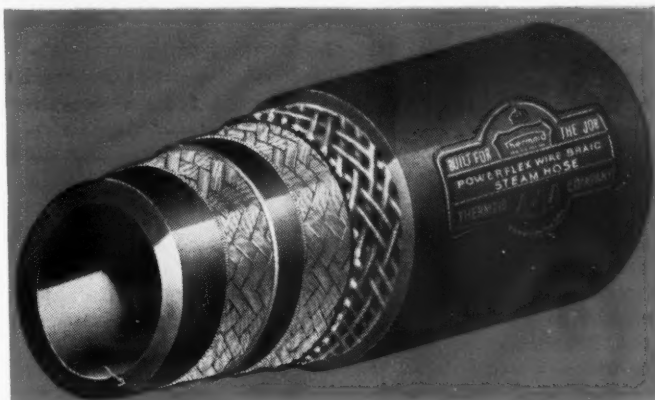
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PLANNING BLUEFIELD EXPOSITION PROGRAM

SOME OF THE KEY OFFICIALS of the 1948 Southern Appalachian Industrial Exhibit to be held in Bluefield, W. Va., Aug. 19-21, working on the many details of the varied program are: James B. Wooldridge (left), assistant director; H. Edward Steele, promotional chairman; William E. McQuail, general chairman; B. B. Housman, assistant secretary, Pocahontas Operators Association, who has served as director of the show since its start a dozen years ago; Fred J. Bailey, chairman of the committee in charge of the Pioneer Miners' reunion; and Norton Claggett, head of the committee that will award prizes for the best homemade invention displayed at the show.

for idle and abandoned properties should be undertaken but is beyond the financial responsibilities of the industry, according to the paper.

Details of six cooperative water-pumping agreements made by Glen Alden, Lehigh Valley and Hudson Coal also were presented. One agreement, for example, covers a pumping plant put in service Jan. 6, 1948, at a cost of \$237,500 to dewater abandoned mines of the Kingston Coal Co. This agreement supplemented one made in 1941 for this area and was necessitated by the addition to the Kingston pool of water from other properties abandoned since that time. The plant consists of two 4,000-g.p.m. Peerless deepwell turbine pumps with 500-hp. motors working against a 399-ft. head. As a further safeguard, another 4,000-g.p.m. unit costing an additional \$64,500 installed has been ordered.

In his discussion of the foregoing paper, C. C. Ballard, electrical engineer, New River Co., Mt. Hope, W. Va., said that 5.3 tons of water per ton of coal was pumped in 1947 from the Cranberry and Skelton properties of the New River Co. and that there had been little change over the past 10 years. At present, the New River Co. has 18 vertical turbine pumps, with a total connected horsepower of 3,600 and total capacity of 33,450 g.p.m. In the next seven months, four more will be installed, for an additional 1,350 hp. and 11,800 g.p.m.

Since 1945, several short-coupled vertical turbine pumps have been installed for shaft bottom work. These units offer definite advantages, Mr. Ballard said, because: (1) they pick up large quantities of sludge and the back-wash upon shut-down stirs the

sludge, thus saving much labor in sump cleaning; (2) self-draining of the discharge column eliminates the possibility of freezing, as can happen when the bypass valve of a horizontal centrifugal pump is not opened.

A 20-in.-diameter borehole costs about \$20 per foot and casing and grouting adds from \$5 to \$7.50 per foot, Mr. Ballard points out. Holes 2 in. larger than the outside diameter of the casing should be drilled to provide space for grout all around. The inside diameter of the casing should be at least 1 1/4 in. larger than the diameter of the pump. About 10 months is required to churn-drill a 20-in. hole 400 ft. deep through the local overburden, which includes white silica sandstone.

Mr. Ballard described the Dry Hill station, which the institute inspected on Saturday. It now consists of three 5,000-g.p.m. A. D. Cook 450-hp. pumping units in a 10x12-ft. shaft 271.5 ft. deep. When a fourth pump of the same size now on order is installed in the shaft, it will be the largest vertical-turbine mine-dewatering station in the world, according to Mr. Ballard. The plant dewateres an 8,000-acre area comprising Skelton, Sprague and Mabscott mines, and during a flash flood last April it saved a mine shut down by operating continuously with all three pumps for seven days and seven nights.

Installation of the Dry Hill plant released 18 pumping units and has saved about \$25,000 per year in power and pumping labor (based on the 1940 wage scale). Normally the pumps are operated only on an off-peak period beginning after 3:30 p.m. An attendant living within 100 ft. of the station starts the pumps. Any pump will stop

automatically when the water flow is materially reduced because of a mechanical or electrical difficulty. A flapper-operated switch at the end of the discharge pipe to the creek stops the pump.

Opening a symposium on conveyor, mining, Fred R. Toothman, mining engineer, C. & O. Ry., Huntington, pointed out that conveyor production in West Virginia increased in 1946, when both the mechanically-loaded coal and the commercial-mines production decreased, but that in 1947 there was a considerable drop in the actual number of conveyor-mining units in operation. Among the new developments he mentioned were: (1) conventional loading machines discharging directly to conveyors; (2) power duckbills; (3) introduction of the conveyor loader; and (4) recent trials of the battery operated "Trike" designed by the H. H. Fletcher Co., of Huntington, (*Coal Age*, May, p. 126).

S. S. Clarke, superintendent, Gauley Mountain Coal Co., Cowen, Webster County, described conveyor mining in the 24- to 54-in. Sewell seam, which has highly variable natural conditions. Hand-loaded chain conveyors discharge to 30-in. 2,100-ft. belt lines, which in turn deliver to mine cars operating on a 60-lb. main-line track. For each \$1,000 of investment on the section, production is 400 to 800 tons annually. The mine, opened in 1944, now is producing 200 tons annually per \$1,000 investment and ultimately should produce 387 tons.

Production on two shifts is limited by ability of the management to keep a force of 60 properly trained cutting-machine operators for the 30 cutting machines in use in the mine. Differential man-trip cars holding 38 men each have been installed and are pulled a mile in 5 minutes.

Mining with Goodman power duckbills at the new Melville mine of the Hutchinson Coal Co., Mcbeth, Logan County, was described by O. G. Schwant, general manager. Cutting is done with Goodman 512 shortwalls with 9-ft. bars and equipped with bugdusters. Formerly, one machine equipped with a crawler truck served two places, but because of the lack of timbering clearance for the trucks the number of machines was doubled so that there is now one in each working place.

Rooms on 40-ft. centers are driven 30 ft. wide and 300 ft. deep. The dead-pan-line system is used in the rooms for bringing supplies to the face. One section foreman supervises two duckbill units. Eight men and a foreman move a duckbill from one room to the next in 7 1/2 hours. Belts haul from the ducks to the outside.

Operation of two Jeffrey CLR conveyor-loaders in 42-in. coal in the new Mine No. 5 (opened in September, 1945), Lorado Mining Co., Logan County, was described by Tom Gettings, a safety director. Replacing hand-loading onto chain conveyors, one CLR loader was installed in Sep-

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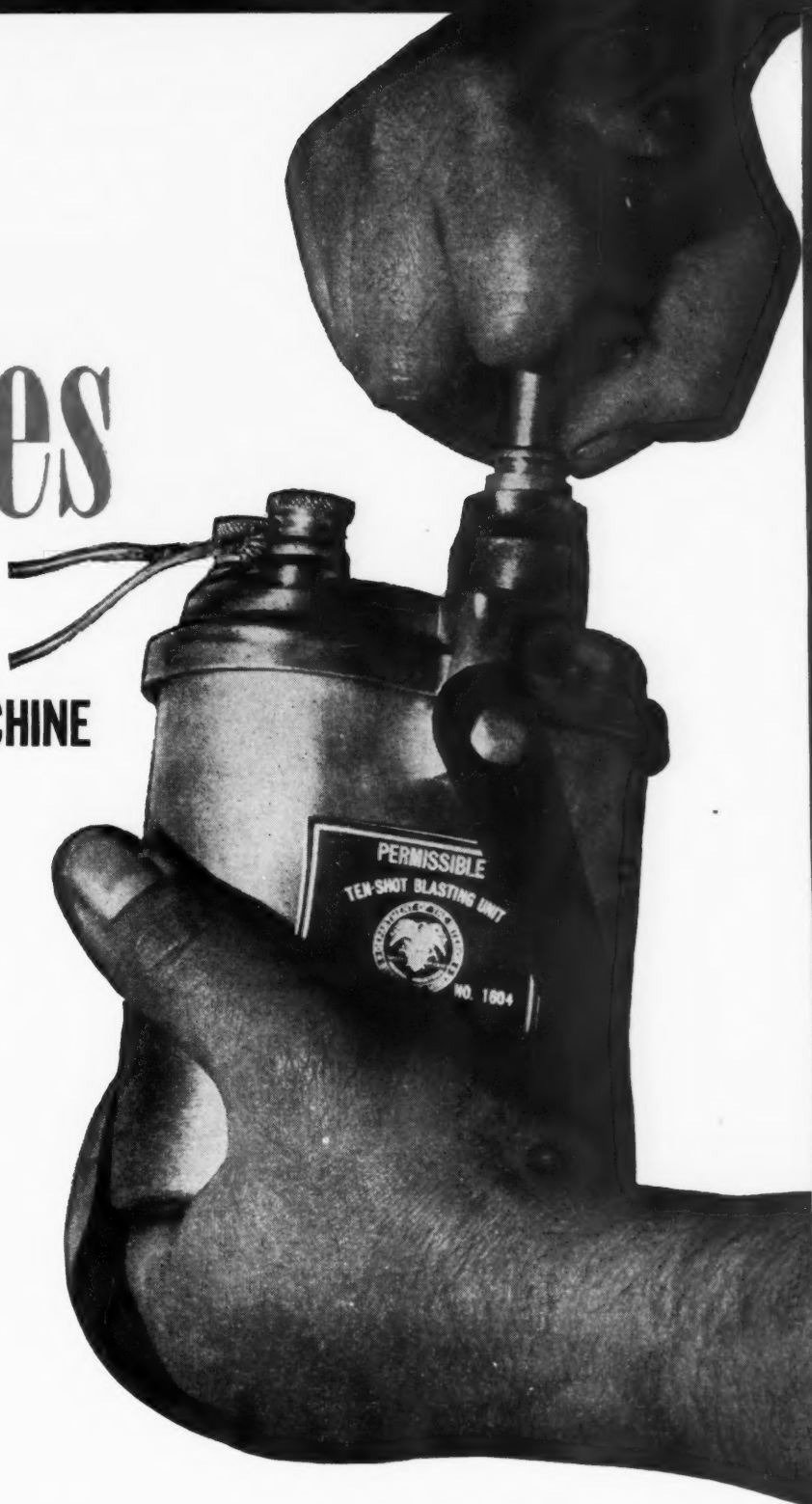
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tember, 1947, and the other in April of this year. Production per unit is 140 to 200 tons per shift. Rooms 35 ft. wide on 50-ft. centers are driven on each side of a triple-heading entry 2,500 ft. long, with a belt and supply track on the center heading.

Nine men comprise a face crew and 20 men are charged to the two loading units. The first machine has averaged 14.7 tons per man-shift for the section, based on a nine man crew. Mr. Gettings also reported man-shift tonnages per section for the same type machines in several mines with better top conditions. The maximum tonnage reported was 24 tons for an unnamed mine in Kentucky. In Mine No. 5, the five shots in a place are fired simultaneously, using a 10-shot battery. To date, no misfires have occurred.

Referring to mention of the "Trike" during the discussion, Mr. Harsany said that a unit of the same general design made in a mine shop and using wheels from a rock-duster has been used in the Lochgelly mine of the New River Co. for several months, with good results.

Anthracite Breaker Slate To Be Used Commercially

Following 20 years of research to find a practical use for breaker slate, Lehigh Materials Co., a subsidiary of the Lehigh Navigation Coal Co., Inc., was scheduled last month to begin production at its new plant near Tamaqua, Pa., of a lightweight aggregate for use in various types of concrete.

The base of the new product, which is to be known as "Lelite," is slate and coal. Its unusual cell construction is said to make possible high insulation and sound-absorption qualities, in addition to its light weight. Because of its fire-resistant qualities, Lelite is adaptable for refractory concrete. It is to be produced in sizes particularly adapted for use in poured structural concrete such as that in bridges and buildings, and also will be used for precast structural concrete products and special products such as floor joists, roof slabs and concrete masonry units.

In the manufacturing process, three furnaces of special design are to be used, each equipped with endless traveling grate. As a mixture of slate and small-sized anthracite passes through the furnace, combustion of the carbonaceous matter produces a temperature of about 2,800 deg. F., at which temperature the carbonaceous matter and some constituents of the slate are driven off as gases. The slate particles are brought to a pasty state and become bloated by the action of the gases. The resulting material is inert and structurally strong. The sinter emerges from the furnace as a cake or slab and is crushed and screened to produce the various sizes desired.

Repeat Summer Safety Drive in Beckley Area

Coal operators in the four fields near Beckley, W. Va., and officials of District 29, U.M.W.A., reportedly were staging in June a joint safety campaign that calls for full compliance with the Federal Mine Safety Code and the mining laws of West Virginia, widespread stress on safety among miners and mine officials, short meetings inside the mines between foremen and underground workers and waiving of penalties for safety-rule infractions at least during the first month of the campaign. The present drive is similar to special efforts sponsored jointly by operators and the union in the summer of 1947 (*Coal Age*, April, 1948, p. 92) and, with some modifications may extend through July and August.

According to recent reports from the area, union officials thus far are encouraged by results of the drive, which began June 1. Plans for the campaign were shaped at a meeting of operator and union representatives in Beckley May 8, when officials of the union and operator delegates representing the Pocahontas, Winding Gulf and Greenbrier fields agreed on details of the drive. At the time of the meeting on May 8, representatives of the New River Operators Association delayed signing the agreement because of doubts about the penalty-waiving clause but it is reported that full support of the drive and authorization to use the association's name on publicity material were granted by telephone after the meeting.

Concurrently with the June campaign, instructors from the U.S. Bureau of Mines and the West Virginia Department of Mines are teaching accident-prevention classes. Already, 500 miners have completed the course and 500 more are enrolled. Union officials declare that these classes will become a permanent part of the union's safety program in District 29.

Preparation Facilities

Elliott Coal Mining Co., Osceola, Pa.—Contract closed with McNally-Pittsburg Mfg. Corp. for all-steel central screening plant with truck and rail hopper for receiving run-of-mine coal and processing at 300 t.p.h.; run-of-mine to be broken to top size of 12 in. and screened at 12x5, 5x2, 2x3/4 and 3/4x0 in., with plus-screenings sizes hand-picked; prepared grades to have alternate loading facilities for railroad cars or trucks; all plus 2 in. can be reduced to 2-in.-minus through McNally-Pittsburg single-roll crusher; 150 tons of storage capacity for truck coal to be provided.

Crowe Coal Co., Reliance Mine, Clinton, Mo.—Contract closed with

McNally-Pittsburg Mfg. Corp. for complete tippie and washer for processing 600 t.p.h. of 6x0 raw coal; plus 6 in. to be hand-picked and reduced to 6-in.-minus in one McNally-Pittsburg gearmatic breaker; 6x0-in. raw coal to be processed in a compound three-washer circuit with middlings recovery box for all middle-gravity fractions; washed coal classified at 6x3, 3x1 1/4x3/4, 3/4x 5/16 and 5/16x 1/2 mm.; 1/2mm.x1/4mm. recovered by desliming over 1/4-mm. vibrating screens, custom coal to be loaded in two 50-ton custom bins; all plus 1 1/4-in. sizes can be reduced to premium stoker grades through McNally-Pittsburg gearmatic stoker coal crushers at the rate of 350 t.p.h.; four-track railroad facilities.

Cameo Coal Mining Co., Cameo Mine, Cameo, W. Va.—Contract closed with McNally-Pittsburg Mfg. Corp. for complete tippie and washer, 400-t.p.h. run-of-mine capacity; excessive lump to be broken in McNally-Pittsburg gearmatic breaker; 5x0-in. raw coal to be washed in McNally-Norton automatic washer at 300 t.p.h., with complete classification and dewatering facilities.

Puritan Coal Corp., Puritan Mine, Puritan Mines, W. Va.—Contract closed with McNally-Pittsburg Mfg. Corp. for complete tippie and washer, 400-t.p.h. run-of-mine capacity, with 300 t.p.h. of 5x0-in. raw coal processed in one McNally-Norton automatic washer complete with McNally-Carpenter Centrifugal dryers; complete washed-coal classifying facilities with three McNally-Carpenter centrifugal dryers for dewatering fine sizes.

New River Co., Cranberry Mine, Cranberry, W. Va.—Contract closed with Jeffrey Mfg. Co. for two-compartment 7-ft. Baum jig; capacity, 175 t.p.h., 8x 1/2-in.

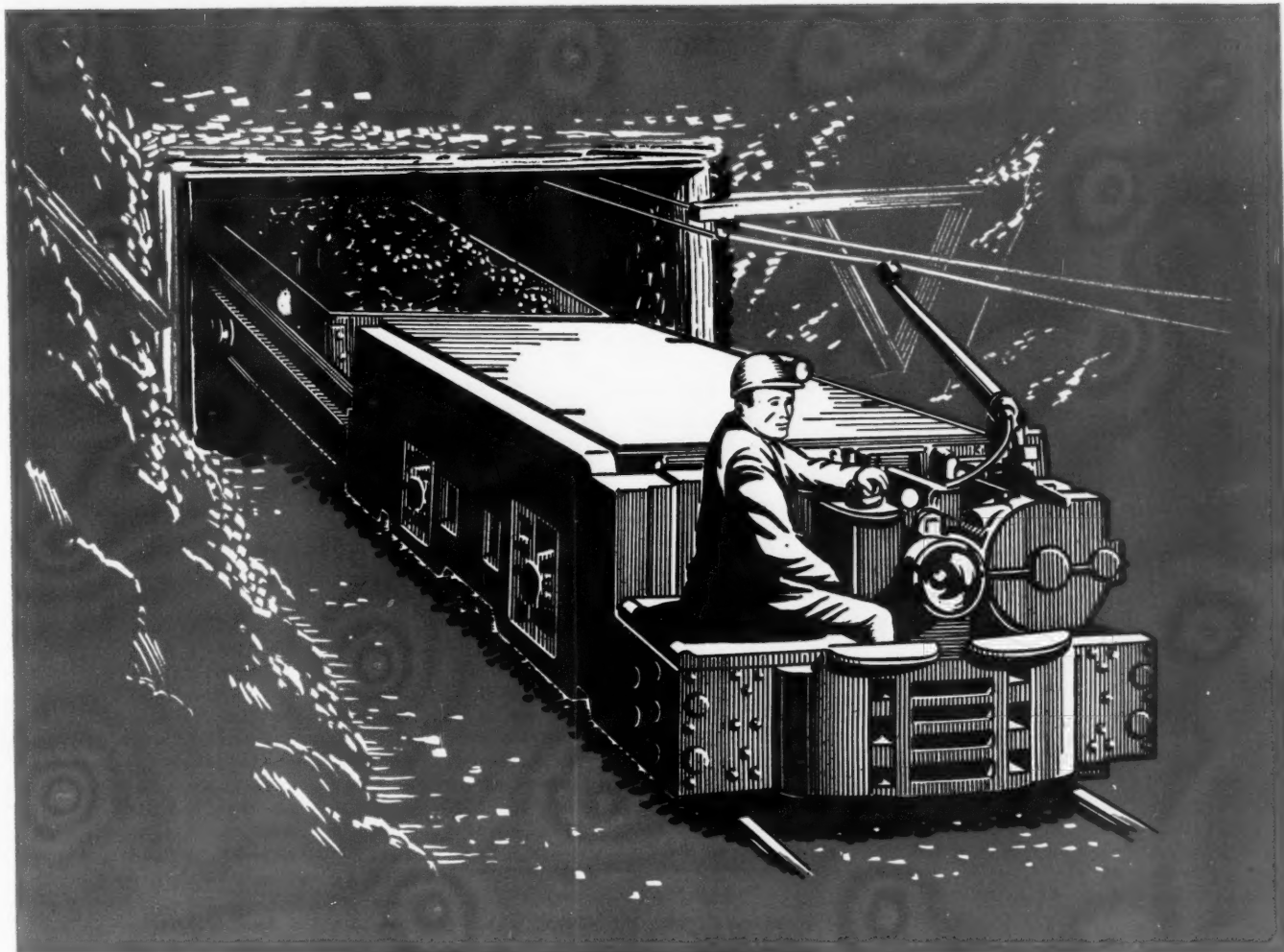
Pardee Curtin Lumber Co., Bergoo, W. Va.—Contract closed with Jeffrey Mfg. Co. for tippie equipment; capacity, 300 t.p.h. run-of-mine.

Mt. Olive & Staunton Coal Co., Staunton, Ill.—Contract closed with Jeffrey Mfg. Co. for washer equipment; capacity, 60 t.p.h., 1/2-mm.

Blue Bird Coal Co., Harrisburg, Ill.—Contract closed with Jeffrey Mfg. Co. for single-compartment unit washer; capacity, 75 t.p.h., 6x0-in.

North-East Coal Co., Thealka, Ky.—Contract closed with K. Prins & Associates for two preparation plants, complete with stoker-coal crushing and rescreening facilities; tipples to be of wooden construction erected by the coal company. The three-track plant, with capacity of 150-t.p.h. run-of-mine, will be equipped with Robins vibrating screens and belt conveyors and McLanahan crusher. The four-track plant, capacity 200-t.p.h. run-of-mine, will be equipped with Robins vibrating screens and belt conveyors, McLanahan crusher and Phillips automatic crossover car dump.

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INSTITUTE LEADERS, with speakers on fires and explosions—C. P. Kelly (left), retiring president, chief mine inspector, Division of Mines, Big Stone Gap, Va.; C. A. McDowell, secretary, director of industrial relations, Coal Division, Jones & Laughlin Steel Corp., California, Pa.; J. D. Edwards, anthracite state mine inspector, Wyoming, Pa.; Murrell Reak, state mine inspector, Department of Mines and Minerals, Springfield, Ill.; George Tillie, assistant mine inspector, Bureau of Mines and Mining, Bicknell, Ind.; J. W. Fitzjarrell, state mine inspector, Fort Smith, Ark.; J. H. Hansford, director, mine rescue and safety, Department of Mines, Charleston, W. Va.; and J. A. Russell, coal mine inspector, Bituminous Casualty Corp., Sullivan, Ind.

Mine Inspectors Scan Safety Methods

MINE FIRES AND EXPLOSIONS, belt fires, haulage accidents, roof falls and strip-pit accidents held the attention of over 225 mine inspectors, company officials and guests at the 38th annual convention of the Mine Inspectors' Institute of America, Columbus, Ohio, June 6-9. J. E. Jeffreys, state mine inspector, Des Moines, Iowa, was moved up to the presidency of the institute, succeeding C. P. Kelly, chief mine inspector, Virginia Division of Mines.

Reporting on an explosion in the Schooley shaft, Knox Coal Co., Exeter, Pa., on Apr. 10, 1947, John D. Edwards, 13th anthracite district mine inspector, Wilkes-Barre, Pa., pointed out that methane seeping up through small fissures in the bottom rock from an underlying seam had formed an explosive mixture in the main haulage-way near abandoned workings. This explosive mixture, ignited by what is presumed to have been an electric spark, caused the death of 10 men and injury to seven others.

Investigation showed that the ventilation system was at fault, Mr. Edwards stated. The system was based on an exhaust fan that drew air into the Schooley shaft, through the working places, thence through abandoned workings, up through an abandoned shaft to the Pittston seam and finally to the fan shaft leading to the surface. This latter shaft, having been gradually blocked by moving or settling, slowed down the ventilating current and made possible the accumulation of an explosive mixture. The mine foreman, Mr. Edwards declared, was aware of the change in the volume of air entering the section but continued to operate the section while trying to

find the reason for the decrease in air.

In an explosion at the Franklin colliery, Lehigh Valley Coal Co., Luzerne, Pa., a heavy pitch, ranging up to 60 deg., caused the faces of some chambers to "run," making it impossible to test for gas and thus permitting an accumulation of methane, Mr. Edwards continued. Ignited by an electric

arc, by smoking or by a defective cap lamp, an explosion of this accumulation killed eight men in December, 1947. Investigation revealed that the accessible abandoned workings had not been inspected weekly, as required by law, main doors were not erected in pairs and air was not circulated in sufficient quantities. Also, electric motors on shaker-chute and conveyor lines, as well as switches, were of the open type. At the time of the explosion, a door had been standing open for seven minutes for transportation purposes, thus depriving the affected workings of ventilation. Two explosions followed—one on the gangway in the live workings and a second when a body of standing gas near abandoned workings was ignited by the first explosion.

Summarizing the circumstances and causes of an explosion in the No. 8 mine, Old Ben Coal Corp., West Frankfort, Ill., on July 24, 1947, Murrell Reak, state mine inspector, Department of Mines and Minerals, Springfield, Ill., reviewed the 45-year old practice in Franklin County of recovering barrier pillars when cross entries are driven up to their boundaries and the panels are worked out. When travel and examination cannot be maintained to the inby end of the cross entry, the air customarily is shorted at this point, leaving abandoned but unsealed territory beyond. Methane may accumulate in this abandoned portion and may possibly come out into the live workings.

In Illinois, Mr. Reak reported, it now is mandatory that such abandoned territories be sealed off but there are yet no uniform regulations governing the kind of materials, size

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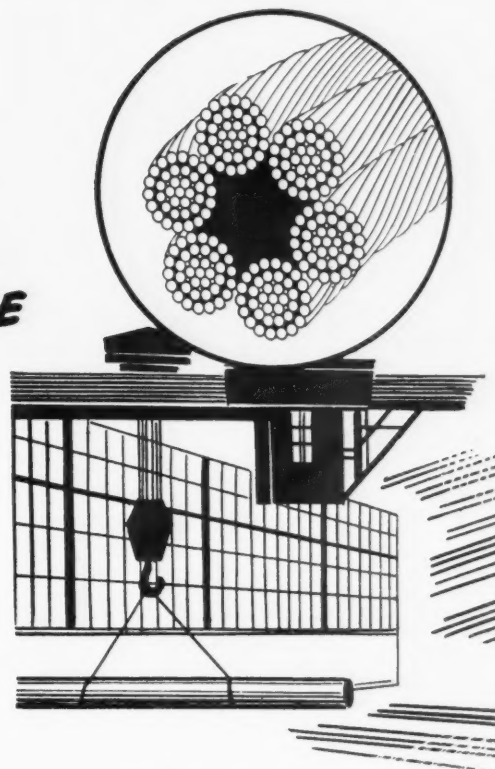
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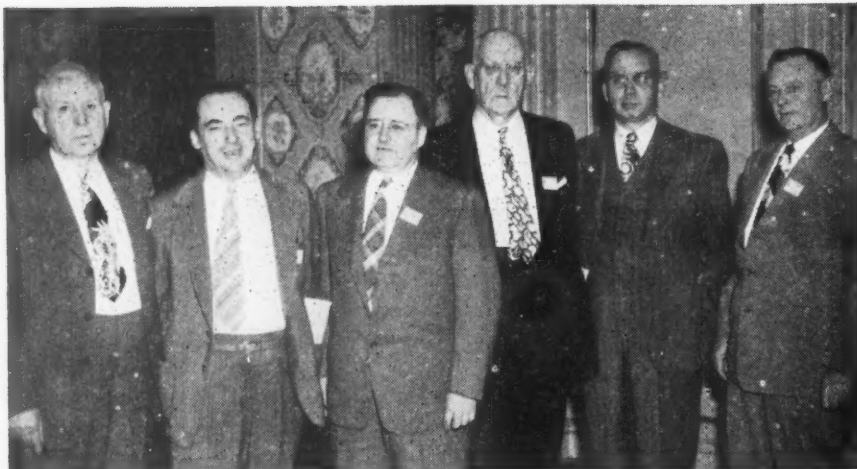
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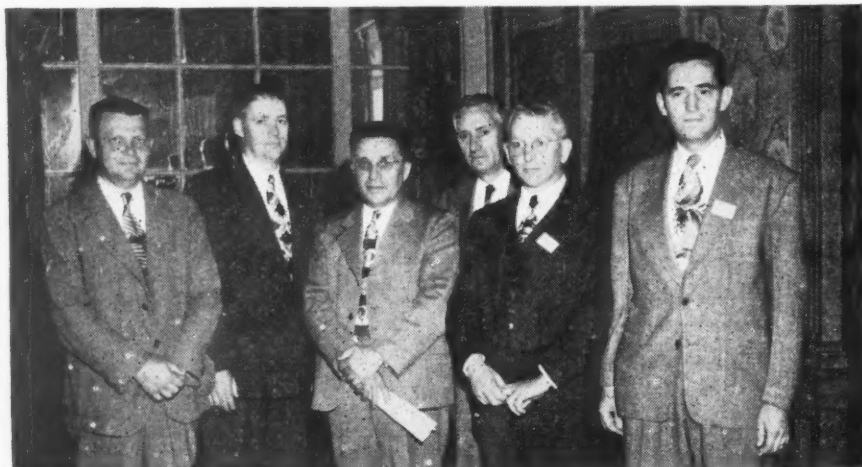
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ROOF FALLS AND STATE LAWS—Richard Maize, secretary, Department of Mines, Harrisburg, Pa.; E. M. Thomas, mining engineer, Coal Mine Inspection Branch, U. S. Bureau of Mines, College Park, Md.; C. C. Conway, chief engineer, The Consolidated Coal Co., St. Louis, Mo.; P. J. Callaghan, bituminous state mining inspector, Bridgeville, Pa.; F. J. Forsyth, electrical engineer, Department of Mines and Minerals, Pikeville, Ky.; Robert Weir, assistant director, Department of Mines and Minerals, Springfield, Ill.



HAULAGE, STRIPPING AND COMMUNICATIONS—K. C. Lee, anthracite state mine inspector, Wilkes-Barre, Pa.; Andrew Hyslop, Jr., chief engineer, Hanna Coal Co., St. Clairsville, Ohio; W. J. Schuster, safety director, Hanna Coal Co., St. Clairsville, Ohio; Lester Briscoe, electrical engineer, Ayrshire Collieries Corp., Indianapolis, Ind.; D. W. Cosslett, anthracite state mine inspector, Wanamie, Pa.; and E. E. Felegy, mining engineer, Health and Safety Branch, U. S. Bureau of Mines, Salt Lake City, Utah. B. H. Mills, safety inspector, U. S. Coal and Coke Co., Lynch, Ky., was not present for the picture.

and location to be used in making seals. To prevent explosions like the Old Ben disaster, Mr. Reak recommended continuous patrol of all seals made in pillar extraction while operations are in progress, assignment of attendants to open and shut doors between intake and return airways, regular air sampling, good ventilation and adequate rock dusting. He urged also that state, federal and management officials seek further improved methods to prevent other explosions like this one.

On April 30, 1947, about four weeks after the safety shutdown of 518 mines by order of the Coal Mines Administrator, an explosion killed eight men in the Kerns mine, Spring Hill Coal Co., Terre Haute, Ind. A report on this disaster, prepared by Griff Morris, Indiana Bureau of Mines and

Mining, Indianapolis, was read by George Tillie, assistant mine inspector, Bicknell, Ind. By agreement between company and union officials, development and production work was forbidden pending completion of the new haulageway and air-course entries necessary to make the mine safe before reopening, and blasting was forbidden until all men, except the shot-firer, were out of the mine. However, both terms of the agreement were violated, Mr. Morris reported.

A blown-out shot ignited dust raised by two previous shots and caused an explosion, which in turn fired wooden or brattice-cloth stoppings. Lessons to be learned from this disaster, Mr. Morris concluded, are: (1) black blasting powder, which was being used in the Kerns mine, is dangerous and should be forbidden; (2) rock

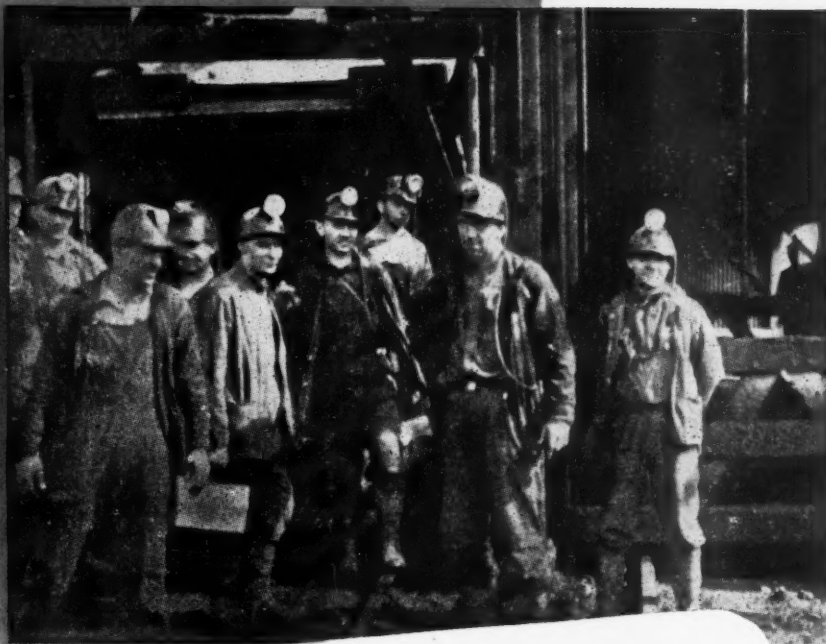
dusting, which did not meet standards of the Federal Mine Safety Code in the Kerns mine, might have prevented spread of the explosion beyond the working faces; and (3) a mine that liberates little or no methane, such as the Kerns mine, is not always immune to widespread and disastrous explosions.

An explosion in the Sunshine mine, E. H. Noel Coal Co., Excelsior, Ark., was caused by heaving of the bottom, which liberated an excessive amount of gas, reported J. W. Fitzjarrell, state mine inspector, Department of Mines, Fort Smith, Ark. The men working in the entry affected by the explosion, he added, had noted the upheaval of the bottom but had paid little attention to the condition it created.

Safety lessons to be learned from the Sunshine mine explosion, Mr. Fitzjarrell pointed out, are: (1) adequate ventilation, properly distributed and controlled, must be provided; (2) an adequate quantity of rock dust must be applied; (3) competent officials must examine a mine completely before electrical equipment is operated; (4) doors should be self-closing and not latched open; (5) doors should be erected in pairs and one should always be shut; (6) only permissible flame safety lamps should be used; (7) matches and smokers' articles should not be permitted underground; (8) before men start work, the mine should be examined thoroughly by a competent fire boss; (9) explosions can and do occur in non-gassy mines; (10) safe procedures should be followed in blasting; and (11) when shooting on shift, all places should be tested for gas before and after shooting. In addition, Mr. Fitzjarrell declared, men and officials should be trained to observe and correct abnormal conditions of any sort and there should be men in each section specially trained for locating and building barricades and carrying out first-aid and mine-rescue work.

Citing eight recent fires in belt-operated mines in West Virginia, John N. Hansford, director, mine rescue and safety, West Virginia Department of Mines, urged proper maintenance of the belt line itself, use of properly maintained overload protection in the belt electrical circuits and adoption of a mining plan that provides ways to contain a mine fire as the best ways to avoid belt fires or to control them if they do occur. Five of the fires discussed by Mr. Hansford originated in the wiring of the conveyor unit or in the electrical circuits of the belt-driving machinery and three were caused by friction on the belt itself. Cable failures or insulation breakdowns, he reported, resulted from improper protection against overload or inadequate maintenance of protective elements. A fire resulting from an overloaded conductor, he added, kindles rapidly because the motor windings and copper cables are preheated to high temperatures, which easily ignite the coal dust

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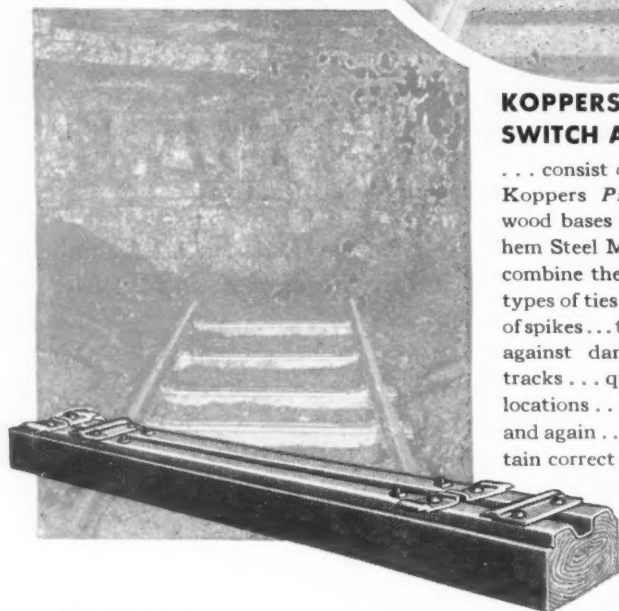
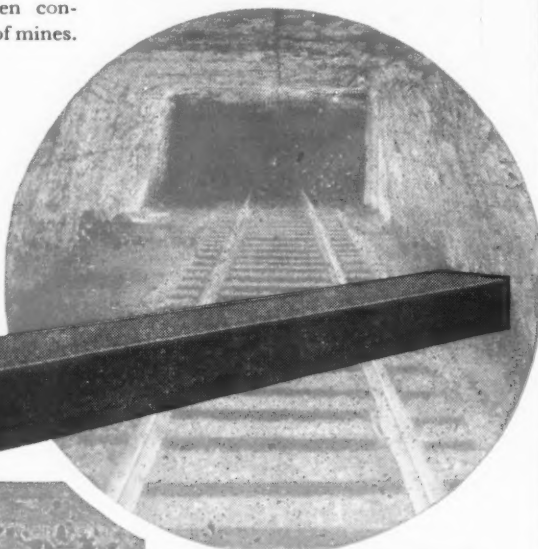
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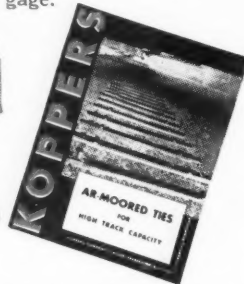
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and oil drippings usually found in the nearby debris.

Mr. Hansford listed the origins of the five fires due to electrical causes as follows: (1) a short circuit in the power cables alongside the belt; (2) an overload on the drive-motor cables or structure wiring in an outside structure which housed the main belt, causing a fire that spread to the belt and thence 200 ft. inside the mine; (3) cable failure at a driving head inside the mine, with the cable lying underneath gob and coal, which spread the flame to the belt; (4) an accumulation of dust and coal at the tailpiece, causing the belt and tail pulley to foul and resulting in a drive-motor overload that caused insulation failure; and (5) a coiled cable which became red hot, burned the insulation and started a fire that spread to the belt. These five fires, Mr. Hansford contended, could have been prevented by proper overload protection maintained in a workmanlike manner. Poor housekeeping, although not a cause of the fires, was responsible for their spread in every instance.

The three belt fires involving mechanical difficulties, Mr. Hansford reported, arose from: (1) slippage of the drive pulley because of too much load or failure to tighten the belt after splicing; (2) slippage of the drive pulley when coal packed tight around the tail pulley and prevented turning of the belt and pulley; and (3) slippage due to fouling and improper maintenance.

Fighting fires in belt mines usually is difficult because seams generally are thin and haulageways and air courses are narrow, Mr. Hansford said. The best method, if possible, is to get on top of the fire with rock dust and/or water. Since all but one of the fires started near the belt head or spill-in point, these vulnerable spots should be given extra protection by patrols, automatic fire controls that will release water and/or dust in response to excessive heat, better overload protection and fire-resistant cable. Calling attention to the perilous position of men caught behind a fire with no means of exit except the belt or a crawl of a mile or more through air courses, Mr. Hansford reported that the West Virginia Department of Mines is giving special attention to approval of the ventilating systems of belt-operated mines.

Conveyor-belt fires may be caused by short-circuited wires coming in contact with the belt while it is not running or by failure to grease bearings, which, when frozen, may heat rollers and thus set fire to the belt, declared James A. Russell, coal mine inspector, Bituminous Casualty Corp., Sullivan, Ind. Accumulations of coal and dust along the belt, with occasional spillage of oil, should not be overlooked as a hazard, he added. Citing two belt fires to illustrate his points, Mr. Russell stressed seven precautions to prevent and control belt fires, as follows: (1) all belts should be



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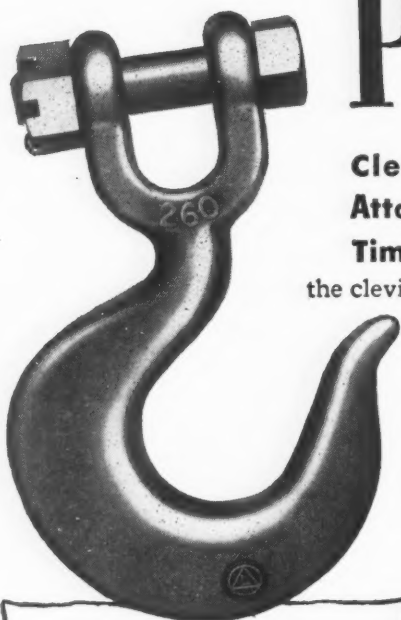
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placed on a separate split of air to provide escape for men from behind the fire area and access through fresh air for fire-fighting; (2) all electrical conductors should be insulated wire, stretched tight on insulators in all entries except the belt entry; in the belt entry there should be no wires except where necessary to pass under or over the belt and these wires should be placed in conduit to protect them against falls of roof; (3) fuses should be used that will cut off current flow when short circuits occur; (4) coal dust should be cleaned up around the belt line and a heavy coating of rock dust applied; (5) bearings or rollers should be kept lubricated but excess oil or grease should be kept cleaned up; (6) bags of rock dust and chemical fire-fighting equipment should be placed at frequent intervals along belt and electric lines as well as near electrical machinery; and (7) a regular patrol of belt lines should be made several times a day.

In the discussion following the two papers on belt fires, A. D. Sisk, safety director, Big Sandy-Elkhorn Coal Operators' Association, Pikeville, Ky., commented on the new field for safety work opened up by Mr. Hansford and Mr. Russell. R. G. Gehlsen, electrical engineer, Mines Equipment Co., St. Louis, Mo., suggested that mine electricians, in selecting cable for belts and belt controls, consider the continuous load carried by belt drives as opposed to the intermittent loads carried by machine cables and urged that they specify wire sizes accordingly. J. J. Forbes, chief, health and safety division, U. S. Bureau of Mines, noted that these two papers presented belt-fire hazards for the first time to the institute and urged belt manufacturers to develop a fire-resistant belt to reduce fire hazards.

"Our accomplishments in the prevention of roof-fall accidents have lagged 14 percent behind our accomplishments in the over-all picture," declared Richard Maize, Pennsylvania Secretary of Mines, who led off the discussion of accidents from falls of roof and coal at the Wednesday morning session.

The three big reasons for roof-fall accidents, Mr. Maize contended, are inadequate supervision of the working face by mine officials, lack of proper roof support and the belief that roof that is only "pretty good" is safe. The remedies, he added, are continuous supervision by management and a refusal by miners to rely on their personal judgment of roof conditions.

"In many respects, safety at the face still is in the horse-and-buggy days," said Edward Thomas, mining engineer, Coal Mine Inspection Branch, College Park, Md., who continued the discussion of accidents from falls of roof and summarized methods currently being used to reduce roof-fall accidents. Mr. Thomas listed the characteristics of ideal roof support as follows: (1) unfailing protection for men who must work at the

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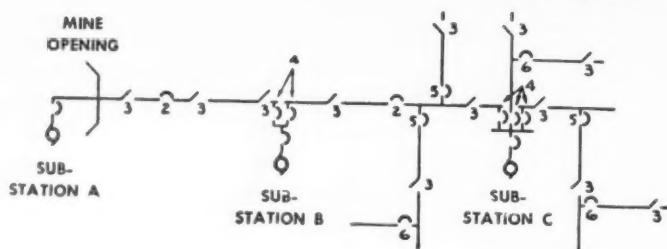
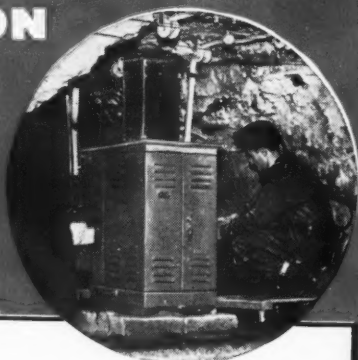
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face; (2) freedom from dislodgement by loading heads or conveyor booms; (3) room for the loading machine to clean up or for a hand shoveler to work between the machine and the face; (4) speed and ease of installation, if it is temporary support; and (5) reasonable cost.

Pointing out the three major classifications of roof support, Mr. Thomas summed up the merits of several methods under these three classifications as follows:

Temporary supports employing legs —(1) pin-jack method: no restrictions on the working space of men or machines, ready acceptance by workers, quick installation and dismantling, reduction in loading-machine clean-up time, no supplementary clean-up by hand and higher operating speed for the loading machine; (2) skid mounted supports (*Coal Age*, January, 1948, p. 110): ease of handling, no dismantling necessary, ease of forepoling where roof is extremely dangerous and adequate working room for the loading machine.

Temporary legless supports — (1) expansion-bolt method and (2) peg timbering (*Coal Age*, May, 1947, p. 110), both of which provide adequate protection and maximum lateral clearance. The expansion-bolt method involves driving expansion bolts through weak immediate roof and into the overlying strong limestone or shale. An 8x6-in. steel plate at the lower end of the bolt provides a bearing surface for the nut. These expansion bolts may be placed to within about 2 ft. of the face and, after the face has been advanced several cuts, the soft roof is taken down and the hangers are recovered. In peg timbering, wooden crossbars are supported by steel pegs inserted in holes drilled in the coal ribs near the roof. This method can be used only if the coal seam is structurally firm.

Permanent legless supports — (1) hitch timbering, in which a wooden or steel crossbar is supported in hitches drilled or cut into the coal rib (*Coal Age*, Dec. 1947, p. 104; Jan. 1948, p. 94), and (2) suspension supports (p. 86, this issue).

Concluding, Mr. Thomas pointed out that the rapid advance of faces in modern mechanized mining makes individual judgment of roof conditions unreliable and that therefore the roof always should be supported in face regions regardless of its character and appearance.

Bolting the roof by suspension rods at the No. 7 mine, Consolidated Coal Co., Staunton, Ill., has improved safety and enlarged the area of economical mining, declared C. C. Conway, chief engineer of the company. Limestone lying above the slate in the No. 7 mine is unusually strong and never is less than 20 ft. thick but the slate immediately overlying the coal has little structural strength, is pocketed with "clods" and ranges in thickness from a few inches to 7 ft. As the thickness of the slate increases, the difficulties

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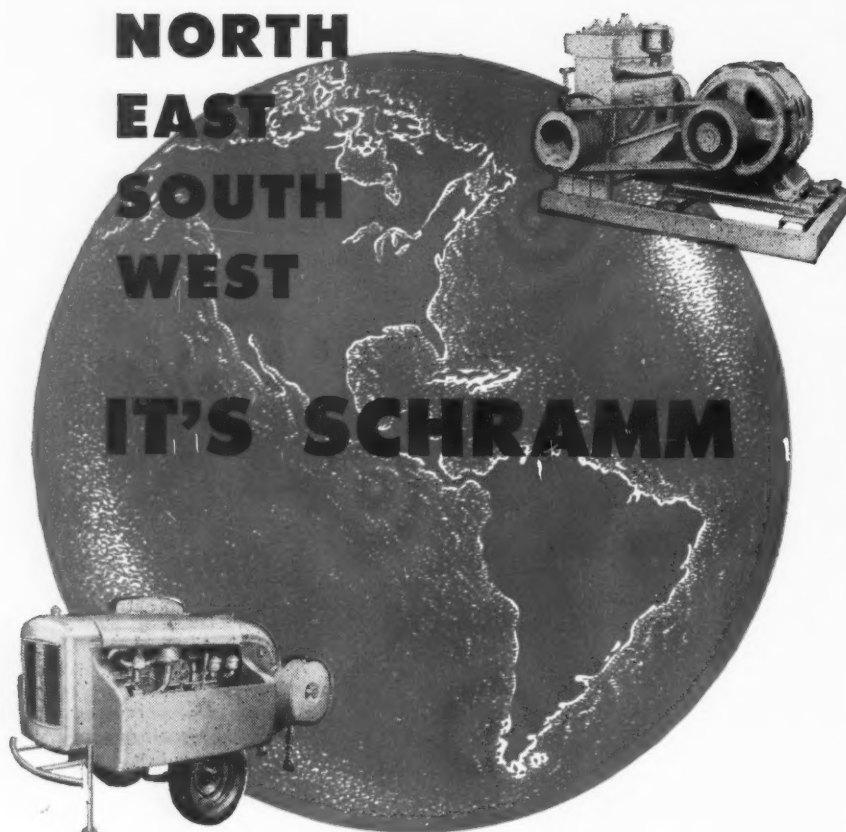
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of safe and economical mining increase. Taking into account the numerous slips in the slate, which made it treacherous, and studying carefully the stress arches above succeeding cuts, company officials decided to try suspension bolting.

Since a stratum of slate can be viewed as a beam capable of giving support as long as it does not sag, it was obvious that if the slate could be held in place by roof bolts until conventional timbering could be installed, the beam would have all its original strength. The unbroken ribs then would carry the major part of the load, supplemented by the timbers and roof bolts. Bolting is done as close as possible to the face before the coal is undercut, providing greater safety for face workers and giving support to the roof within 9 ft. or so of the new face after the coal is undercut and shot.

Essential parts of the bolting equipment, Mr. Conway said, are: an expansion shell similar to that used to support trolley wire; a 1-in.-diameter bolt long enough to penetrate into the limestone; a section of channel iron, sometimes spanning two or more bolts, to act as a washer; and a special nut used to tighten the rod in the expansion shell and to facilitate removal of the rod when desired. In concluding, however, Mr. Conway warned that suspension rods are no substitute for timbering but only a supplemental support that prevents loss of the roof's original beam strength before adequate timbering is possible.

Reports on recent important changes in state mining laws, occupying the second half of the Wednesday morning program, were made by P. J. Callaghan, mine inspector, Pennsylvania Department of Mines; Frank J. Forsyth, electrical engineer, Kentucky Department of Mines and Minerals; and Robert Weir, assistant director, Illinois Department of Mines and Minerals.

New or amended Pennsylvania laws require a mine foreman, if the fan stops, to order men out of the mine within 30 minutes if a gaseous mine and within 60 minutes if a non-gaseous mine; provide that all dry and dusty parts of a mine be rock-dusted whether gas is being generated or not; require 65 percent of incombustible material on all rock-dusted surfaces; demand a bar or gate on all man cages and blocks to secure cage while men or materials are entering or leaving; require switches or circuit breakers on haulage roads to de-energize trolley and feeder lines at intervals not exceeding 2,000 ft.; demand that loading-machine operators and drillers in gassy mines be competent to detect roof hazards and dangerous concentrations of gas; empower the secretary of mines to regulate mines employing fewer than five men; require flame-resistant insulation on all trailing cables after April 1, 1949; and set up a program for sealing abandoned mines.

(Continued on page 148)

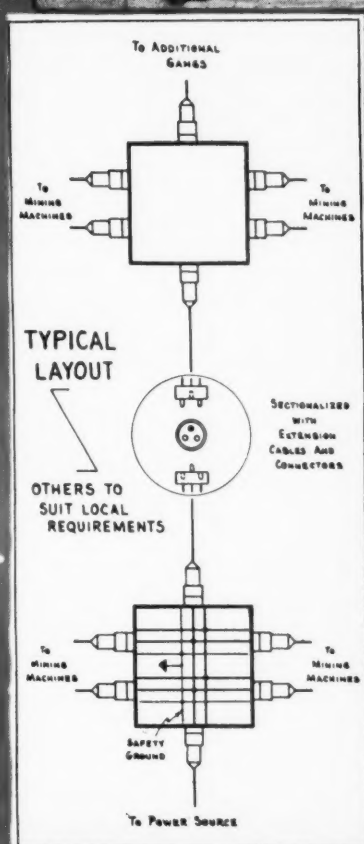
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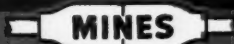
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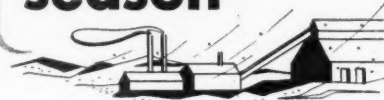
Amended Kentucky laws define a gaseous mine as one "in which the percentage of explosive gas exceeds 0.5 percent at the return of any one split if a dusty mine, or 0.75 percent at the return of any one split if a non-dusty mine"; increase the number of inspectors from 14 to 33; require weekly reports of inspections to the chief of the Department of Mines and Minerals, the operator or superintendent and the mine committee at each mine inspected and posting of the inspection report at the mine where employees may read it; set up new standards for ventilation; demand rock dusting of all gaseous mines and, if conditions are dusty or hazardous, of all non-gaseous mines; require rock dusting of all dusty mines or dusty parts of damp mines to a minimum percentage of 55-percent non-combustible material; and require that fire bosses submit weekly records of daily inspections, which must take place three hours before each shift enters the mine.

In Illinois, new laws and revisions require a monthly inspection of each mine; increase the number of districts and inspectors; set up new standards for appointment as mine inspector; require certification of face bosses; raise ventilation standards; require rock-dusting up to and including the last open crosscut in every working place, room and entry to a minimum of 65-percent incombustibles; require the use of water or wetting agents in dusty mines; set up a laboratory to analyze mine air for gas and dust; forbid mine inspectors to solicit or accept contributions from coal companies, their agents, miners, local unions or union officials; and authorize three new mobile rescue units in the coal fields.

"Accidents underground have been reduced to a point where refinements in our safety work are called for," declared A. J. Bartlett, director of safety, Island Creek Coal Co., Holden, W. Va., whose paper, leading off the discussion of haulage safety on Wednesday afternoon, was read by Kenneth C. Lee, state mine inspector, Wilkes-Barre, Pa. "In addition to dealing with accident prevention as a broad general subject," Mr. Bartlett explained, "we should examine each operation and occupation with a view toward determining the hazards for men performing that particular job."

Citing statistics showing that between 1930 and 1940 fatalities from all causes were reduced 50 percent while those from haulage were reduced only 33 percent, Mr. Bartlett reviewed the records in West Virginia, Illinois and Pennsylvania. These records show that in West Virginia, for example, on a man-hour exposure basis, fatal accidents on haulage are three times greater and non-fatal accidents 10½ times greater than accidents resulting from roof falls. Of the 384 men killed in haulage accidents between 1940 and 1944 in West Virginia, 48 were killed in derail-

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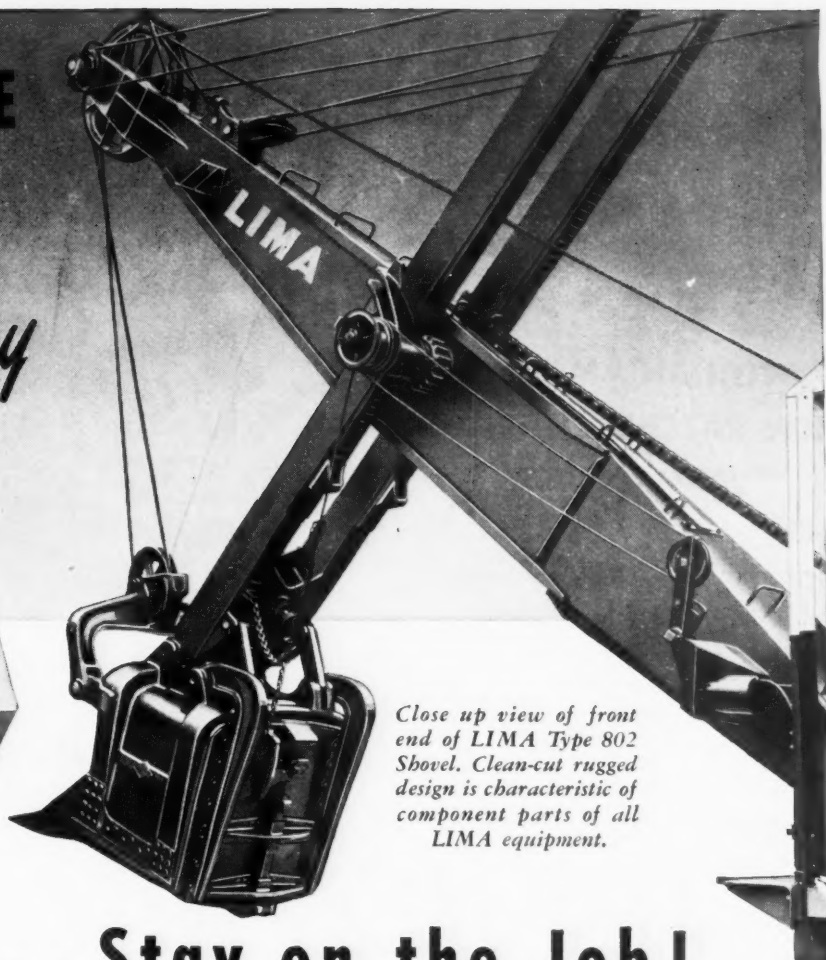
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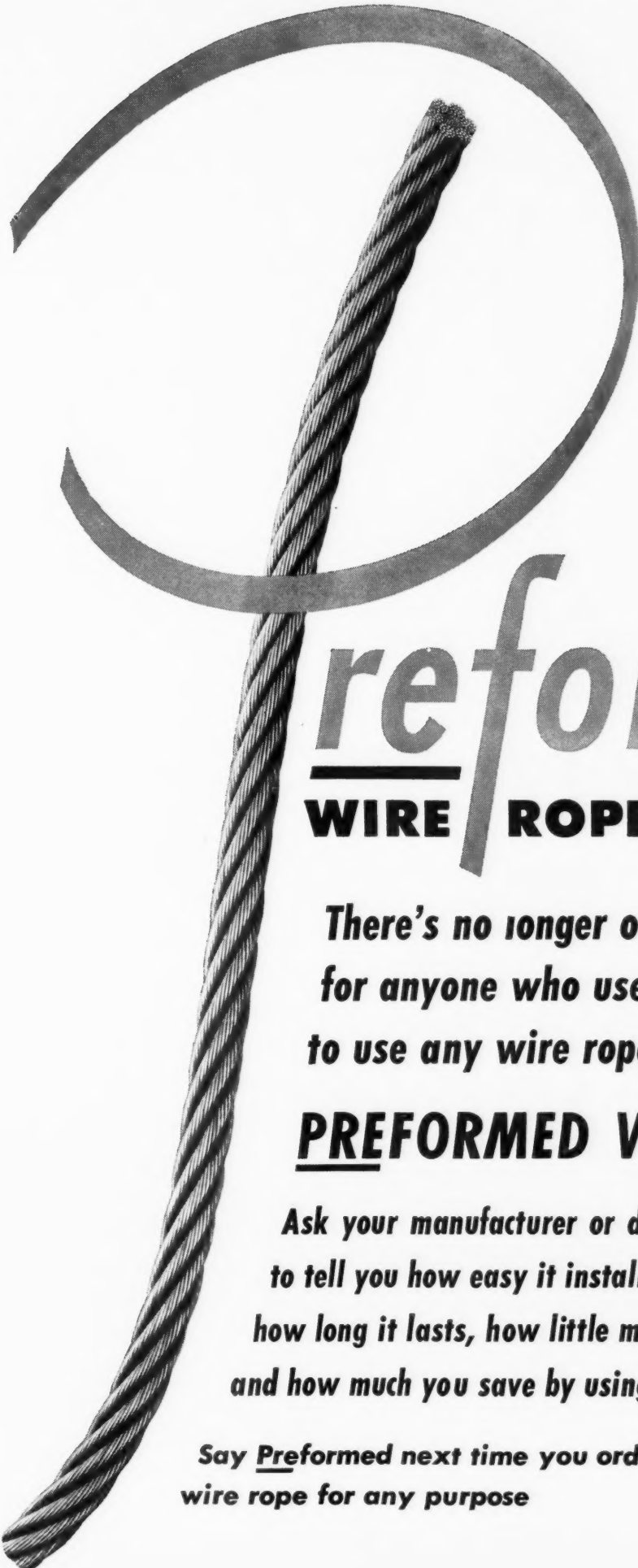
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ments, 15 while coupling and 321 from other causes, including insufficient clearance, collisions, trips breaking loose on grades, runaways from improper scotching and blocking, crushing between face or rib and car, crushing under low top, being dragged out of motor deck by cable, catching in track while handling switches without throws, falling out of motor, getting off in front of moving trip, jumping or falling to escape electric arc, being caught by loose clothing and dragged into close clearance, excessive speed, backing up without signal from brakeman, starting trips without orders or signal, disregarding dispatcher's orders, standing up on deck for nipping, standing up while riding a trip, jumping from runaway trip, falling from car after sudden stop, crossing track in front of oncoming trip, jumping on front bumper of moving cars and motors, riding front bumper of trip being pushed, failing to align switches properly and riding between cars.

Ninety percent of all the men killed in these haulage accidents in West Virginia, Mr. Bartlett pointed out, had more than five years' mining experience. Accident statistics in Illinois and Pennsylvania differ from those in West Virginia, he added, but they all point to the following conclusion: such hazards as are caused by insufficient clearance and lack of switch throws can be corrected by proper installation but by far the greatest percentage of accidents can be eliminated only by education and discipline of workers.

"Proper safety training of all employees will do more than anything else to reduce accidents," said Andrew Hyslop Jr., chief engineer, Hanna Coal Co., St. Clairsville, Ohio, who continued the discussion of haulage accidents. Such a program must start with the wholehearted backing of top management and must keep safety always in the minds of employees, he contended. Foreman, trained for safety work by a competent safety engineer, must be the key men in this program.

In addition to continuous training of workers, there are physical improvements that will help cut haulage accidents, Mr. Hyslop declared. Among these physical improvements, he listed the following: (1) improvements in equipment—"the safety program must be backed up by an honest effort to make the working conditions and equipment as safe as possible;" (2) track—a minimum rail size of 40 lb., with at least 60-lb. rail for secondary haulage roads; road bed properly drained, ballasted and elevated; proper radii on curves; parallel switch throws; (3) timbering—proper protection of roof supports from derailments, wider use of guniting and thorough track cleaning; (4) lighting—good lighting along the main haulage road, provided by a 110-volt a.c. circuit entirely separate from the trolley line; (5) signal system—block sig-



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nals on all single-track lines, with strict enforcement of traffic rules, and wider use of trolley phones; (6) mine cars—use of automatic and semi-automatic couplings, together with larger-capacity mine cars, thus cutting down the number of cars to be handled; (7) locomotives—redesign of locomotives to provide greater protection for trip-rider and motorman by replacing the square-end bumper with a semi-circular plate of rolled steel of about the same height as the locomotive frame, thus shielding the motorman, giving room for the trip-rider and providing room for re-railers and other equipment off the top of the locomotive.

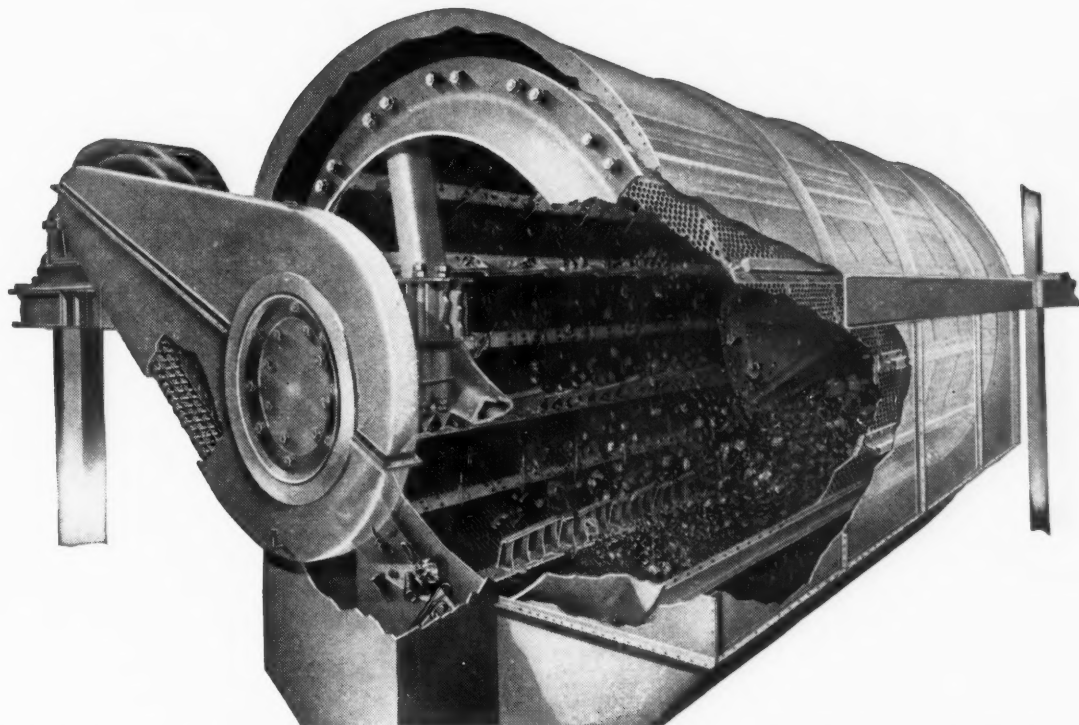
In the discussion following the two papers on haulage, Richard Maize, secretary, Pennsylvania Department of Mines, urged that manufacturers be encouraged to build locomotives along the lines suggested by Mr. Hyslop. W. D. Northover, safety engineer, Rochester & Pittsburgh Coal Co., Indiana, Pa., after asking for clarification of Mr. Bartlett's use of statistics, pointed out that 15 percent of all exposure to accident among all underground employees is exposure during haulage.

Any strip-mining operation should produce a much better safety record than the best underground mine, declared W. J. Schuster, safety director, Hanna Coal Co., St. Clairsville, Ohio. Failure of the stripping industry to measure up to this standard is due to the preoccupation of men accustomed to deep mining with the new technical problems of stripping, with a consequent neglect of the safety factors involved. The biggest job in accident prevention is persuading workmen to carry out safe practices, he said. To attain good safety performance, Mr. Schuster urged the following program: (1) formulation of standards for safety in the various stripping jobs, asking the supervisory force to help in compiling rules and inviting the mine committee to discuss the rules before they are put into effect; (2) proper stress on safety at the time a new man is employed; (3) continuous supervision to encourage observance of safety rules; and (4) sincerity on the part of management, based on good relations with workmen.

Limiting his discussion to the electrical accident record of his company in its stripping operations and the preventive methods set up to avoid accidents, Lester Briscoe, electrical engineer, Ayrshire Collieries Corp., Indianapolis, Ind., declared that an excellent safety record has been established since the installation of the neutral ground resistor and the fourth wire from the equipment frame to the substation transformer neutral. To test the continuity of the return ground fourth wire, one of the ground wires in the cable is insulated from the other two ground wires and from the copper braid over the individual conductors.

At the shovel, all the ground wires

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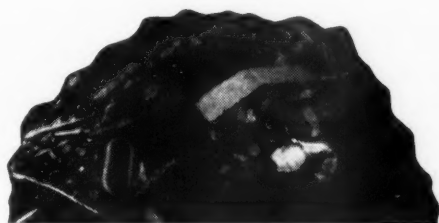
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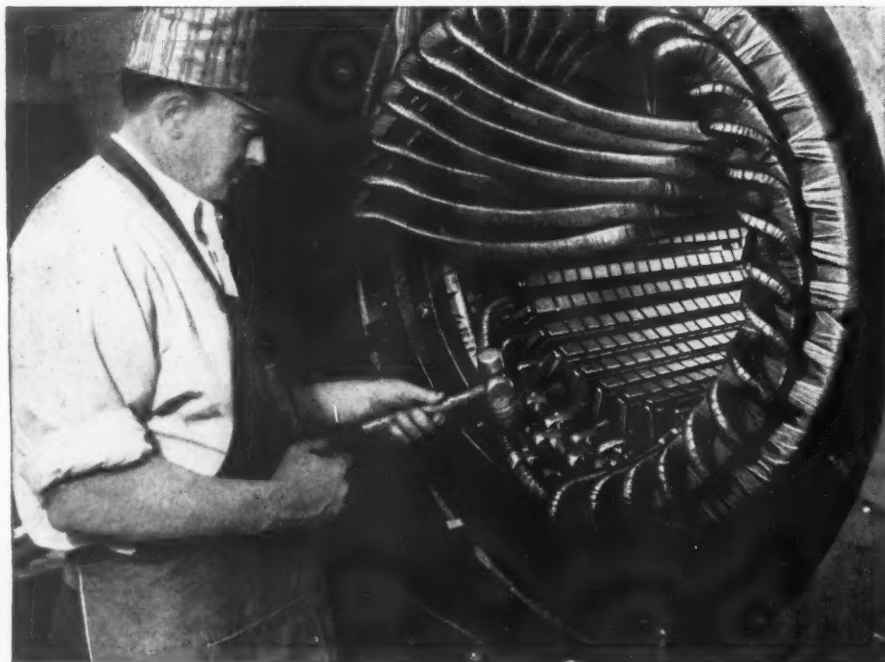
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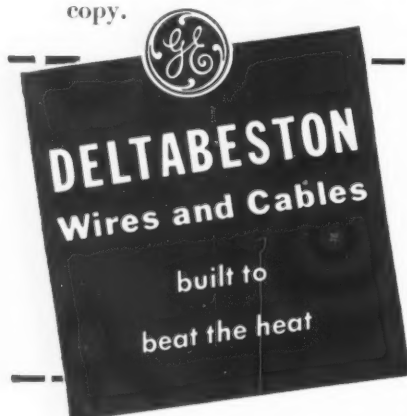
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and the copper braid are connected to the frame of the equipment. Portable hill or switch houses are connected in the feeder circuit to each shovel. At each switch house, a low-range d.c. ammeter in series with a storage battery may be connected in the ground circuit by a small drum controller. The insulated ground wire serves as one leg and the other two ground wires, in connection with the copper braid over the conductors, serve as the return leg of the circuit. By moving the drum connector off neutral, the operator opens the insulated ground wire lead and inserts the d.c. ammeter and storage battery into the ground circuit. A comparison of current flow with tabulated results of the installation when new gives, to a fair degree, condition of the ground circuit. Use of low voltage insures against high-resistance connections and an open cable.

Since this equipment will not show an open in the fourth wire beyond the trailing cable, a 7,500-volt primary fused cutout, 25-amp. fuse, has been installed on the base of the high-voltage equipment, Mr. Briscoe said. One side of the cutout is connected to one phase of the 4,160-volt system and the other side to the equipment frame. At frequent intervals, usually twice a month, the primary cutout is closed, shorting one phase to the ground. This test trips the first oil circuit breaker in the cable system from the shovel. The test is made with all operating personnel advised and with all equipment idle. Satisfactory tripping of the automatic switching equipment indicates that the ground-fault protective equipment is operating properly.

Regarding the grounding of 220- and 440-volt, three-phase delta transformer secondary circuits, Mr. Briscoe suggested the derived neutral—a neutral on the delta power systems derived by zig-zag transformers and a grounding resistor similar to the installation used on high-voltage three-phase systems.

New safety problems in stripping have been created by changes from slow-moving equipment to high-speed diesel, gas and electric motive power, from shallow pits to pits measured in hundreds of feet, from small quantities of explosives to tons and from isolated pits to pits near thickly populated areas, said David W. Cosslett, mine inspector, Department of Mines, Wanamie, Pa.

For safer blasting, Mr. Cosslett suggested the following: (1) zones of caution should be established; (2) shot firers must be fully competent; (3) stemming material, free of coarse particles, should be placed beside each hole before delivery of explosives; (4) no open lights or smoking should be permitted in the shot area; (5) explosive containers should be stacked in piles at least 25 ft. from the nearest drill hole and should be opened only as needed; (6) stemming should be placed in each hole immediately after loading is completed, with care to pro-



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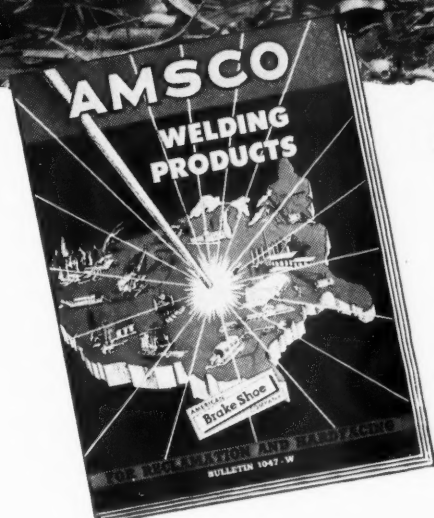
test the detonating fuse and electric detonators from damage; (7) large dynamite cartridges should not be dropped unless the hole is free from obstructions for its entire length; (8) if primacord is used, it should be covered with fine material, such as dirt or culm, to reduce noise from the shot; (9) the blasting machine should be kept in the possession of the shot firer during the connecting of the blast and until the shot has been fired; and (10) if underground operations are going on close by, the person responsible for the underground work should be notified of the exact time of firing. To reduce vibrations set up by blasting, Mr. Cosslett suggested balancing the charge so that the energy released is the minimum required to move and break the rock properly, taking into consideration the distance from buildings, the type of overburden and the nature of the rock.

To make pit operations safer, Mr. Cosslett stressed the following: (1) overhanging rock ledges should be forbidden and men should not be permitted to work under the dipper; (2) if a straight shovel is used, the confronting bank should be kept to the height of the loading boom; (3) movements of shovels and draglines should be signaled so that men may get into the clear; (4) moving parts of machinery should be guarded and walkways and stairs should be firmly fastened and should have hand rails; (5) machinery should not be oiled while in motion; (6) electrical and mechanical equipment should be checked daily; (7) in night operations, the pit should be well lighted; (8) trucks should be checked daily for brakes and steering; (9) drivers should stand outside the cab while the truck is being loaded; (10) in coming out of the pit, trucks should be driven on the side nearest the declining spoil bank; (11) roads on an incline should be wide enough to permit passing and should be kept free of any objects that might interfere with braking or steering; (12) bumping blocks should be provided for trucks backing toward a spoil bank and a workman should direct the driver toward the block.

Developments in radio communication to assist in underground rescue operations were discussed by E. W. Felegy, mining engineer, Safety Branch, Health and Safety Division, U. S. Bureau of Mines, Salt Lake City, Utah. Most efforts by the Bureau have been concentrated on low-frequency radio, which appears to offer greatest possibilities for use by the mining industry, Mr. Felegy reported. Experiments using low-frequency radio have been conducted between underground points, underground and surface points and in shafts and slopes in the Bureau's experimental mine, in two commercial bituminous mines, in three anthracite mines and in a salt mine and an iron mine. In the Reliance mine, Philadelphia & Reading Coal & Iron Co., Mt. Carmel, Pa., for example, communication was achieved

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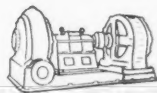
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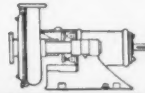
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through soil and strata up to 1,050 ft., 950 ft. vertically and 445 ft. horizontally, and intermittent communication was established up to 2,040 ft. Best results were obtained at frequencies of 60 to 80 kilocycles. Many questions about radio voice communications underground remain to be answered, Mr. Felegy declared. Some of these questions possibly can be answered by the Bureau and the mining industry and others possibly require attention by the electronics experts of radio manufacturers. On the whole, though, progress has been made and there is reason to hope for results of real value later, Mr. Felegy concluded.

Commenting on Mr. Felegy's paper, J. J. Forbes, chief, Safety Branch, Health and Safety Division, U. S. Bureau of Mines, stressed the promise of these developments, asked for suggestions from mining men present at the meeting and urged the mining industry to request additional congressional appropriations to carry on further investigations.

Dust control in multiple-shift conveyor operations is a major problem and should be given serious consideration by mining men who plan elaborate installations and large tonnages, warned B. H. Mills, safety inspector, U. S. Coal & Coke Co., Lynch, Ky. In his company's operations, Mr. Mills reported, chain, shaker and belt conveyors installed in coal averaging 36 in thickness include six mother belts 1,800 to 3,400 ft. long, 26 lateral belts 800 to 1,700 ft. long and 74 room conveyors 280 to 320 ft. long. Three-inch water pipelines are installed along all mother conveyors and 1-in. pipelines along all lateral conveyors and chain and shaker pan lines to the working faces. In addition, water sprays are located at all loading points where coal is discharged into mine cars and water taps with valves and 100 ft. of hose are located at 300-ft. intervals along all underground belt lines. Ten bags of rock dust also are kept at these intervals, which are marked by electric lights. Rooms are turned from both sides of panel entries and are worked retreating in pairs.

Undercutting is the greatest producer of coal dust, Mr. Mills pointed out. To allay this dust, water is forced through a hose on the machine directly onto the cutter bar and the coal also is well sprinkled after being shot down. At discharge points, where spillage adds to the hazards of dust, the spillage is cleaned up periodically. Since the high velocity of air needed for thin-seam mining picks up dust and deposits it throughout the mine, all haulageways and conveyor pan and belt ways are kept rock-dusted to 65 percent of incombustibles. It has been found, Mr. Mills reported, that rock-dusting by hand in thin seams is more efficient and economical than rock-dusting by any machine thus far developed.

Final business of the meeting included the adoption of a progress re-

port offered by the Standardization Committee, Dr. J. J. Rutledge, chairman, chief mine engineer, Annapolis, Md., and selection of Pittsburgh, Pa., as the host city for the 1949 convention.

Coal Foreman to Address Big Management Meeting

Sharing the spotlight with big industry chieftains, Harrison Maynard, tippie foreman, No. 7 mine, Island Creek Coal Co., Holden, W. Va., and past president of the Island Creek Management Club, will deliver one of the principal addresses at the three-day convention of the National Association of Foremen in Philadelphia, Sept. 23-25. Thousands of delegates from the national organization's 300 affiliated clubs, representing some 37,000 members in nearly all branches of industry, are expected to attend the meeting to be held in the Philadelphia Convention Hall, which will mark the 25th anniversary of the association's founding.

Other convention speakers getting top billing are: Charles M. White, president, Republic Steel Corp., Cleveland; Harry Woodhead, president, Consolidated-Vultee Aircraft Corp., San Diego; and Fred Maytag, president, Maytag Corp., Newton, Iowa. In addition, clinics and open-forum discussion groups will focus attention on many subjects aimed at development of teamwork among management groups, including the following: The American economic system—how it works; the tools for human relations; what the worker really thinks; the foreman's obligation to his men; developing men for executive management; how the foreman can sell safety; security for foremen; labor legislation; and effective self-expression.

Attendance at the convention, it is pointed out, is not limited to members of the National Association of Foremen.

Two Mining Scholarships Established by Old Ben

Two scholarships of \$200 a year for freshmen enrolling in mining engineering at the University of Illinois College of Engineering have been established by the Old Ben Coal Corp. Each scholarship is for a period of four years, dependent on maintenance of satisfactory scholarship and continuance at the university. Preference, among equally qualified candidates, is to be given to Old Ben employees or sons of employees.

Awards are to be made by the university's committee on special undergraduate scholarships, on recommendation of the head of the Department of Mining and Metallurgical Engineering. Applications may be addressed to: Secretary, Illinois Mining Institute, 28 East Jackson Blvd., Chicago; or Department of Mining Engineering, University of Illinois.

RAIL

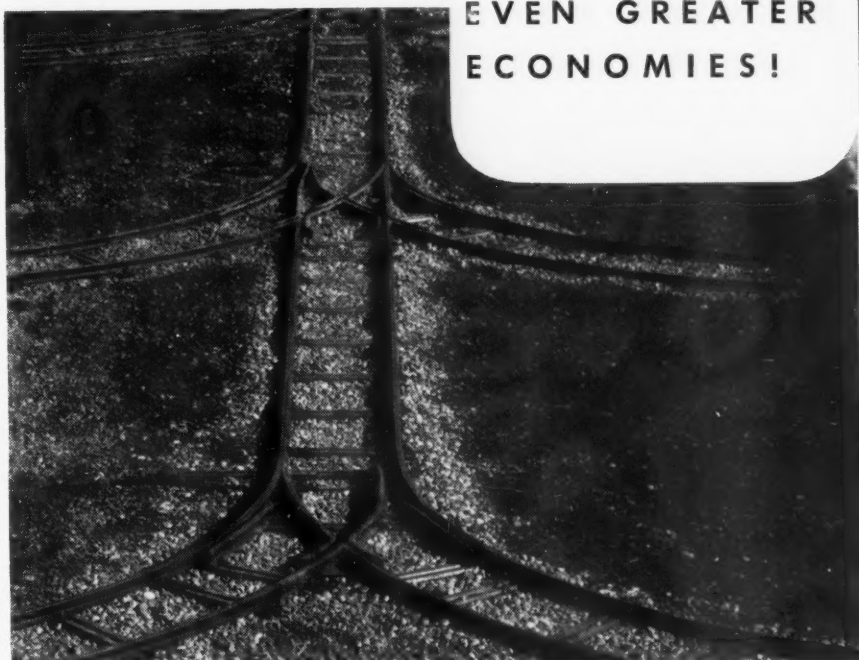
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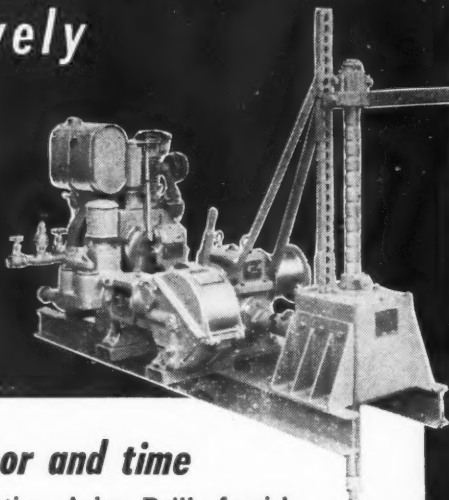
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Foreign Developments



Great Britain—For their first year under nationalization Great Britain's coal mines will show a loss of about \$100,000,000, according to reports in the press last month. Official figures for 1947 are expected to be released shortly by the Coal Board.

The Coal Board is understood to feel that regardless of these heavy losses, the nation's mines can be made to pay in the long run. They point to the fact that when the mines were taken over there were many immediately critical problems and that these difficulties take time. They call attention to the fact that during the war many mines were kept going under government subsidies and that the Coal Board had to absorb these charges. In addition, the five-day week and higher wages have added to the costs, with increases in the price of coal not permitted until after heavy losses had been incurred.

Paris—France's nationalized coal industry reportedly is going into the hole, with production costs topping income by 3½ percent.

Spiraling wages and falling output per man hour are the government's excuses. Wages are said to be up 21.7 percent over prewar and account for 73.3 percent of total production costs. Over-all output of French mines in May was 13.5 percent greater than the average 1938 monthly production. But there are nearly 40 percent more men in the pits and absenteeism has doubled.

Officials of the Coal Administration are reported not to agree with the government explanation. They say that the government doesn't give the Administration enough authority; that mine directors don't give it enough cooperation. They complain that they aren't permitted to set production policies in advance and that they are bedeviled by all powerful ministerial control officers.

Mine directors also have a different answer. They claim that only 47 percent of gross costs are miners' wages; 26.3 percent, bureaucrats salaries. Only half of the top officials of the Coal Administration have had any experience in the mining industry, according to the directors. They say they are peppered with contradictory orders from the government and the Coal Administration; hobbled by complicated new nationalization laws. As a result, they no longer have the power

to run the pits efficiently and can't crack the whip on absenteeism.

The majority of the miners themselves, including the mining engineers, still are solidly behind nationalization. They think it eventually will mean more coordinated production, more mechanization in mines which were in the red before the war, better working conditions. But the miners, too, would reportedly like to see a shake-down in the front office.

Meanwhile, the French Government has put up \$1,500,000 for joint research with the Belgians on gasification of unmined coal now being conducted near Liege. Mining experts of both countries believe that if perfected gasification methods might be successfully applied in many French and Belgian mines where thin seams make ordinary mining methods unprofitable.

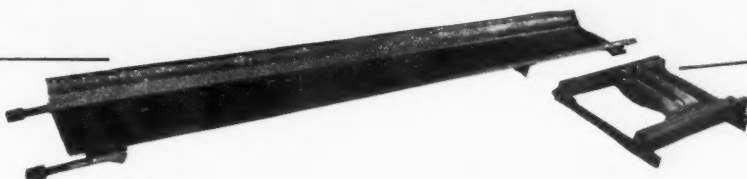
Moscow—Soviet fuel engineers have "in the main solved the problem of underground gasification of coal," S. I. Vavilov, president of the USSR Academy of Sciences, recently stated, adding that "a method for underground gasification of shale is being worked out."

Citing this goal in a recent article that noted Soviet pioneering work in underground gasification as a means to utilize low-grade coals and provide cheaper fuel, A. B. Chernyshev, corresponding member of the USSR Academy of Sciences and a prominent colleague in the Academy's Power Institute, expressed confidence that the combined efforts of Soviet engineers, scientists and workers would result in converting "underground gasification of coal into an independent branch of industry."

Academy Correspondent Chernyshev said that Soviet work in this field has been underway since 1931, when at the initiative of Stalin a government commission for underground gasification of coal was established. Under its auspices, the "Podzemgas" (underground gasification) trust was organized in 1932, and six years later the experimental station established in the Donbass produced by underground gasification gas that was used in firing the boilers of a coke plant "for the first time in world technique," he said. Results were "entirely satisfactory" and in 1940 a second plant was established in the Moscow coal basin.

Commenting on this enterprise which was interrupted by the war, Chernyshev, noted in Moscow for his contribution toward higher productivity of coke-chemical plants, stated: "The work of the experimental stations demonstrated the practical realizability of underground gasification, but at the same time disclosed the necessity of solving a number of scientific and engineering problems associated with wide industrial application . . . At present engaged in rehabilitating and developing the national economy, our country must again resume on a wide front work in underground gasification of coal."

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Hendrick Shaker Conveyor Troughs are made of a special high carbon steel that offers great resistance to abrasion, and to bending or breaking stresses under weight of the coal. The sides of the troughs are shaped to give maximum resistance to buckling.

Troughs are made in standard

lengths of 10 feet, and 10 feet, 2 inches, but can be made up to 13 feet, 2 inches, in any desired size. Accuracy and uniformity in their construction are outstanding features. Hendrick Ball Frames give the troughs substantial support whatever the floor conditions. Write for full information.



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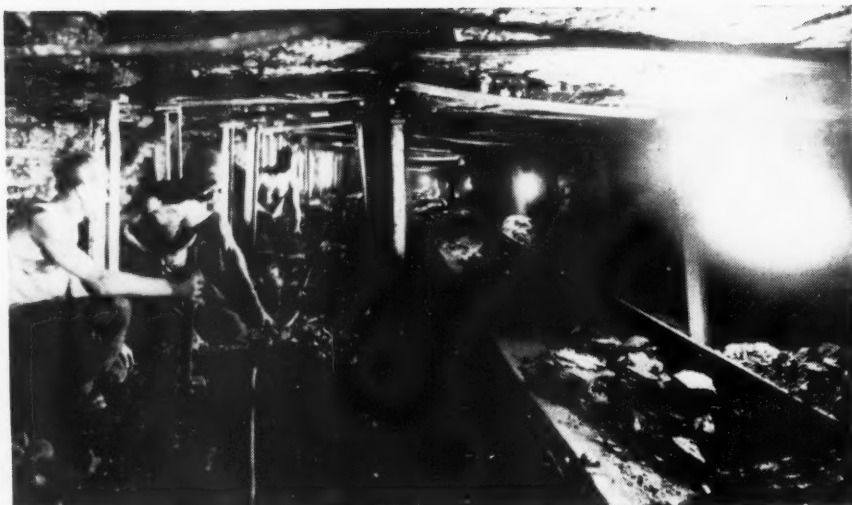
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Fluorescent System Lights British Coal Face

LONDON — (McGraw-Hill WORLD NEWS)—Installation of the first two of a series of new underground fluorescent lighting systems for British coal mines has been completed. Tests show that miners at the face in the two mines have ten times as much light as they formerly had with even the most modern miner's lamps.

The first British mine to be equipped with fluorescent lighting was the Chislet colliery, Kent. Last month No. 36 East Face, Birch Coppice colliery,

Warwickshire, was added to the list. Four additional installations will soon be made by The British Thomson-Houston Co., Ltd., in pits selected by the National Coal Board.

Preliminary experiments in fluorescent lighting have been made in a number of pits since 1945, when Birch Coppice was the first in Britain to have a preview of this new-type illumination. But only recently were tests in coal-face lighting undertaken, to assure conformance with safety regulations and to overcome the mechanical problem involved in moving the lighting systems forward as the face advances.

According to reports, the tests showed that the fluorescent tube is inherently safer than the tungsten bulb and that it may be used with perfect safety under the regulations for a naked light pit. As an added precaution, however, two safety switches are incorporated in the circuit of the fitting, one mounted behind each socket of the fluorescent tube. These switches are spring-loaded; so in case of accident, they open and isolate the fitting if the bulb is broken.

The Mazdalux coal-face fitting used in the pit has been developed by B.T.H. in accordance with experience gained from many tests in mine and laboratory. It is of cast-aluminum-alloy construction and incorporates a cable gland at each end for through wiring. An annealed glass, or "Perspex" cylinder, completely encloses the 40-watt 24 in. Mazda Daylight fluorescent tube and all lamp auxiliary gear is housed within the fitting.

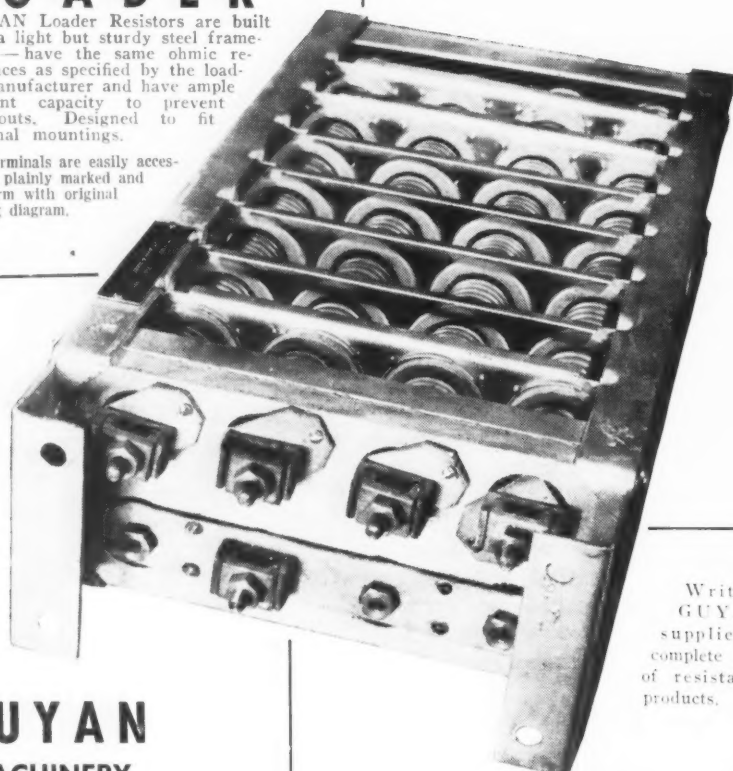
A semi-circular reflector is incorporated in the fitting. It is swivelled round to act as a guard and protect the outer cylinder and lamp during shot-firing. The fittings are approximately 38 in. long, 4½ in. wide and 6¾ in. high.

The No. 36 East Face at Birch Coppice is approximately 100 yd. long and 4 ft. high. Twenty-five fittings have been mounted there, 8 or 9 ft. from the face on the rear row of pit props

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RESISTORS

behind the conveyor on 12-ft. centers. In some cases, they are connected singly with a cable coupler between each two fittings. Others are in pairs, with one coupler between alternate fittings.

The relatively high intensity of illumination of 1.5 lumens per square foot has been recorded on the face, falling to a minimum of more than 0.5 lumens per square foot mid-way between fittings. It is possible to see all the way along the coal face like a well-lighted highway, according to reports.

Europe—United States coal required for Europe will be reduced by 15 percent in the third quarter of 1948 if the recommendations of the Coal Committee of the United Nations Economic Commission for Europe are followed, according to reports. Demands on the U. S. for coal in the third quarter would total 7,500,000 tons if the Committee's recommendations are accepted. Intra-Europe shipments are expected to total 12,000,000 tons, almost 2,000,000 tons above the second quarter.

Australia—More settled labor relations in the coal industry are to be expected in the future as a result of a code of discipline set up at the urgent request of the Coal Board by the Miners Federation, to maintain peace in the industry and to prevent the frequent stoppages for minor or senseless reasons experienced in the past. Since approval of the code by representatives of 57 Miners' Lodges, unauthorized stoppages have reportedly been reduced to practically nothing and coal production has risen satisfactorily.

The code, which includes penalties of fines, suspension or expulsion from the federation for infractions, specifies that:

1. Any matter in dispute shall first be referred to the manager and failing a settlement shall be referred to Lodge officials.

2. If lodge officials and their management fail to agree, the dispute shall be referred to the Miners district executive.

3. There shall be no stoppage, except on safety measures, without authorization by the district board of management or the district executive.

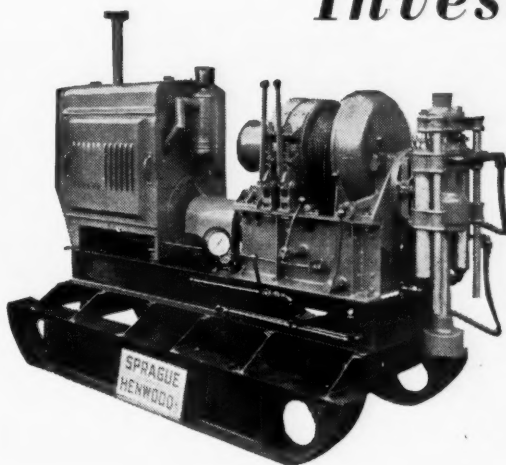
4. The union reserves the right after negotiations have failed, to attain justice for membership by industrial action.

5. Any member or section of members defying a majority decision shall be dealt with under the federation's code of discipline.

Meanwhile, dissatisfaction with existing methods of developing Australia's coal resources was strongly voiced at the annual meeting of the Miners' Federation of Australia. The Council called for an investigation by the Coal Board of the coal losses incurred every year through collapsing roofs.

"It is high time the scandalous waste of the coal resources of Aus-

Investigate



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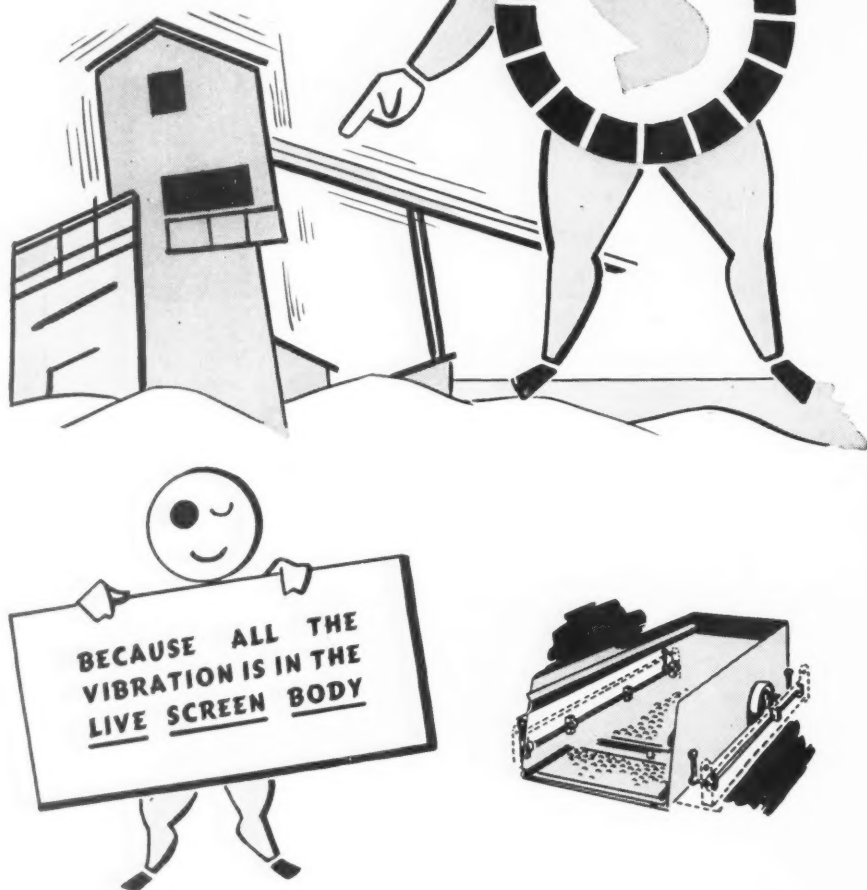
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tralia by profit-dominated uneconomic methods is ended," the Federation's weekly, *Common Cause*, said.

The Coal Board, acting on the miners' demands is planning to bring experts from the United States and Britain to report on all forms of stowage. The Coal Board will also be asked to amalgamate the group of small mines in the Newcastle field into one mine. The Federation also is pressing for a conference with the Coal Board and the Mines Department in regard to the whole policy of opening up new mines.

Coal Publications

Magnetic Control of Electric Motors, by Gerhart W. Heumann. General Electric Series. John Wiley & Sons, Inc., 440 Fourth Ave., New York, N. Y., 1947. 589 pp. 6x9 1/4-in.; cloth. \$7.50. Characteristics of control devices and their operation and the functions of commonly used control circuits. Special emphasis on amplidyne control circuits and maintenance of control equipment. Written for application engineers rather than design engineers, it also contains chapters on a.c. and d.c. motors, contactors and relays, resistors, rheostats, control panels and other subjects.

From the Ground Up, by Paul M. Tyler. McGraw-Hill Book Co., 330 West 42nd St., New York 18, N. Y., 1948. 248 pp. 6 1/4 x 9 1/4-in.; cloth. \$3.50. A survey of the mining industries and mineral economics, with comments on national policies regarding minerals.

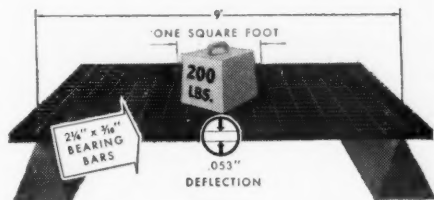
Illinois Mineral Industry in 1946, by Walter H. Voskuil. State Geological Survey, Urbana, Ill. 123 pp. 6 3/4 x 10-in.; paper. How mineral resources in Illinois create and support industrial activity in the state and in the upper Mississippi valley.

Interpretation of Permissible Limits in the Breathing of Toxic Substances in Air, by H. H. Schrenk. U.S. Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Pa. I.C. 7457. An aid to safety officials in interpreting tables of permissible concentrations of harmful substances in mine or factory air.

Control of Roof and Prevention of Accidents From Falls of Roof and Coal, by Edward Thomas, C.H. Seeling, M.V. Hansen and Frank Perz. U.S. Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Pa. I.C. 7471. Improved methods of roof support at the face in mechanized operations. Drawings and photographs.

Applicability of Radio to Emergency Mine Communications: Progress Report, Sept., 1946, to Nov., 1947, by E. W. Felegy and E. J. Coggeshall. U.S. Bureau of Mines, R.I., 4294. 56 pp. plus 17 pp. of illustrations and charts. 8x10 1/2-in.; paper; mimeo.

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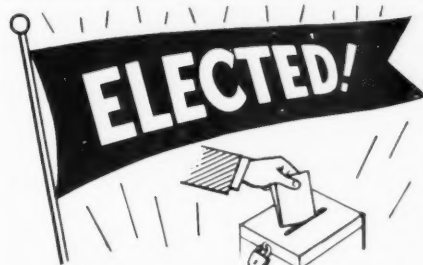
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Free. Results of tests in three categories: (1) communication through the ground; (2) wired communication over the power-distribution system; and (3) inductive communication, using, without direct connection, the telephone, signal and power wires and other metallic materials in the mine. Frequencies used in tests ranged from 33 to 220 kilocycles.

Psychological Aspects of Accident Prevention, by H. J. Sloman. U.S. Bureau of Mines, I.C. 7460. 10 pp. 8x10 1/2-in.; paper; mimeo. Free. The goal in accident prevention is to condition a worker's thinking in an unsafe condition so that he is subject to an irresistible force to correct the situation at once.

Some Observations on Coal-Mine Haulage Hazards, by H. E. Sanford. U.S. Bureau of Mines, I.C. 7467. 13 pp. 8x10 1/2-in.; paper; mimeo. Free. Safe haulage requires good maintenance of track and equipment and strict observance of safety rules. Management must remove all physical hazards within its power, supervisors must cease winking at violations because of temporary conditions and workers must stop taking chances.

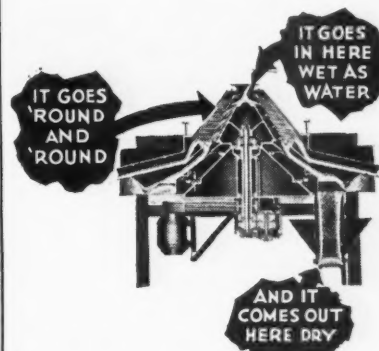
1947 Supplements to the 1946 Book of A.S.T.M. Standards. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa., Five parts, \$4 each. These five supplements, plus the 1946 Book of Standards, give a complete set of A.S.T.M. specifications and tests excepting those on chemical analysis of metals. Part I-A—Metals: ferrous metals and materials; boiler, structural and bar steel; castings, forgings, springs and axles. Part I-B—Nonferrous metals: copper-alloy wire and castings, aluminum and magnesium. Part II—Nonmetallic materials: cement and lime, brick, building stone, glass, thermal insulation, clay pipe, concrete, paint, varnish, lacquer, building construction and thermometers. Part III-A—Nonmetallic materials: petroleum products and lubricants, soaps and other detergents, textiles, industrial water and aromatic hydrocarbons. Part III-B—Nonmetallic materials: electrical insulation, plastics, rubber, adhesives, paper and shipping containers. Total is some 330 specifications, tests and definitions, either issued for the first time or revised since their appearance in the 1946 Book of Standards.

Measurement of Coking Pressure in a Small Laboratory Oven, by B. W. Naugle, J. D. Davis, J. T. McCartney and J. E. Wilson. U.S. Bureau of Mines, R.I. 4285. 15 pp. plus 9 pp. of Illustrations and charts. 8x10 1/2-in.; paper; mimeo. Free. Small-scale laboratory tests are not altogether indicative of what may be expected in full-scale coke ovens. From results obtained, it would be difficult to predict the pressure a sample would develop in the large vertical oven or coke oven or to state definitely that a borderline coal would be safe or dangerous for industrial use.

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The many installations of these "C-M-I" dryers in coal washing plants from Pennsylvania to Washington and Illinois to Alabama have proved that all sizes below 3/8 inch are delivered from "C-M-I's" with less surface moisture than can be obtained from any other type of mechanical dryer or dewaterer.

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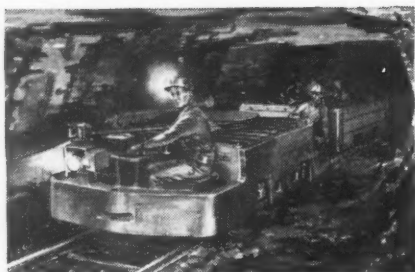


Let us tell you where these machines are in operation so that you may contact the operators and obtain from them full data on an operation similar to your own.

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Equipment News

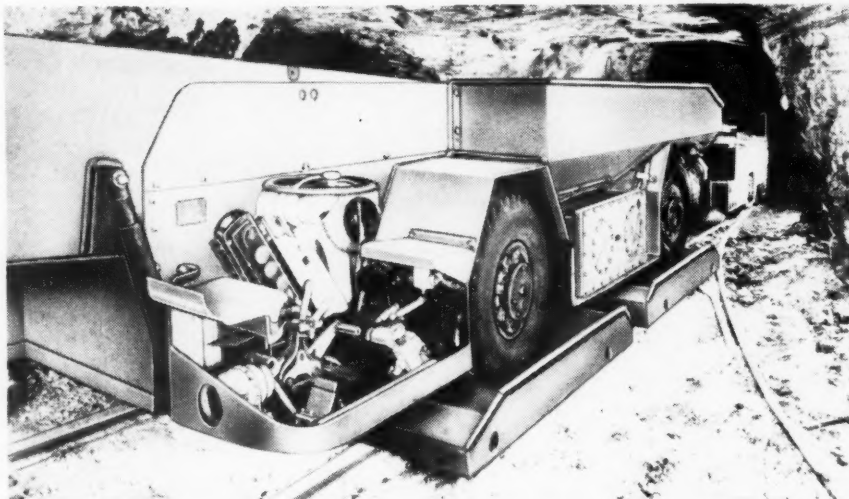
More Detailed Information and Descriptive Literature Normally Are Available on Request Directly to the Manufacturer

Dragline

A new Model 450-W walking dragline said to be especially engineered for sustained delivery of big yardage has been announced by Bucyrus-Erie Co., South Milwaukee, Wis. The unit swings 8- to 10-cu. yd. buckets from 200- to 165-ft. booms. With an 8-yd. bucket and 200-ft. boom, it can move material 407 ft. without throwing bucket, according to the manufacturer.

Among the features of the 450-W cited by the manufacturer are its stability and maneuvering ability. Weights and loads are balanced so that the center of gravity shifts through a limited range, keeping base rim pressures low. Exclusive Bucyrus-Erie rolling cam walking action reportedly permits walking in any direction to positions most effective for digging. Large-area base and shoes, coupled with proper weight distribution, make possible walking and working on soft ground in all kinds of weather, it is said.

Power for high-speed digging and quick, easy moving is supplied by a heavy-duty diesel engine. Hoisting and lowering are controlled by air-operated clutches and brakes, with swing machinery under Ward-Leonard variable-voltage control. According to the manufacturer, construction is simple and sturdy and machine is held in rigid, accurate alignment, is easy to get at for servicing. Light, welded boom, of T-section chord members with tubular bracing, offers maximum strength with minimum dead weight, it is said.



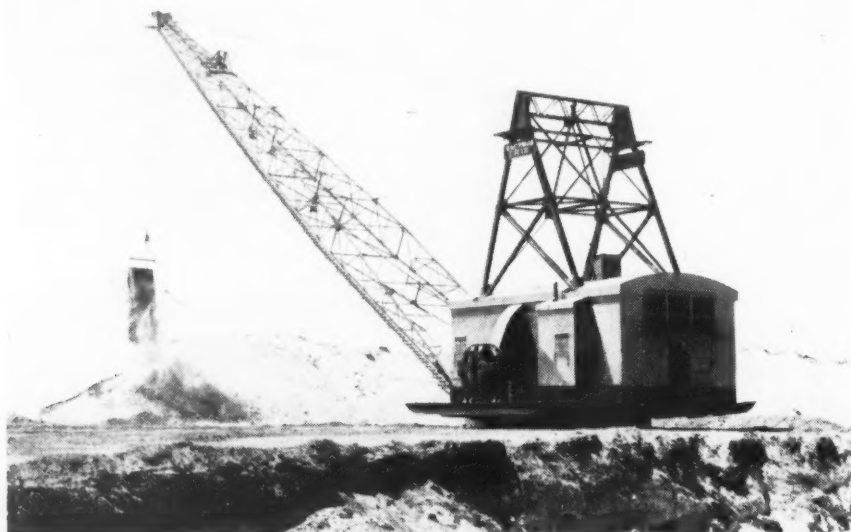
SHUTTLE-CAR CARRIER—Newly improved unit manufactured by Phillips Mine & Mill Supply Co., Pittsburgh 3, Pa., is said to be a compact, durable carrier requiring headroom of only 5 7/8 in., and with an over-all width of 89 in. The unit can be built to fit any track gage and any model of shuttle car.

Cable Splicing, Vulcanizing

A modern cable-splicing and vulcanizing service said to offer coal operators speedy and low-cost cable repair has been announced by Cyril Davidson, 990 Arch St., Washington, Pa. Vulcanizing is performed by a special patented process designed and operated by Mr. Davidson, who formerly has been using a portable vulcanizing shop in servicing coal companies on their property. Reels of cable serving coal-mining equipment subject to rough usage now can be

sent to the company's new enlarged plant, where multiple splices and the necessary vulcanizing can be performed more rapidly and at a lower cost in vulcanizing than if repaired at the mine, according to Mr. Davidson.

With its process, according to the company, insulation on twin parallel, two-, three- and four-conductor round cable (with or without ground wires) is cured before the outer jacket is applied and vulcanized. On special Neoprene-coated cable, this new process reportedly assures a perfect bonding of the insulation. The new process also includes specific compounding of insulation. Cable reels may be trucked or shipped to the plant by rail via the B. & O. and Pennsylvania R.R.'s.



Truck Tractor

A new Model EQT 45,000-lb. basic gross-combination-weight tractor, powered by a Thermodyne engine and offering the exclusive Mono-Shift transmission, has been announced by Mack Trucks, Inc., New York 1. Said to be designed specifically for high-speed tractor operations where exceptional gradeability and over-all high performance are required, the EQT features a new 431 cu.in. Thermodyne engine, which at its governed speed of 2,500 r.p.m. develops 130 hp.

INSLEY standardizes on
J&L Wire Rope to help operators
dig more profits

**J&L
STEEL**



There are fewer replacements . . . less time
lost with **J&L Precisionbilt** Wire Rope

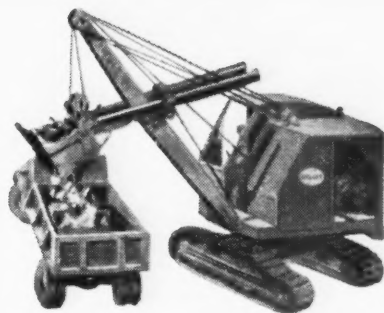
Insley—the world's largest exclusive manufacturer of small excavators—has standardized on J&L Wire Rope, because more and more operators demand equipment that will *stay on the job!* Insley knows that when excavators go down for wire rope replacements, operators' profits go down too.

To build "equipment that makes jobs pay" Insley Manufacturing Corporation, of Indianapolis, Ind., demands stamina and quality for every part—including the best in wire rope.

J&L Precisionbilt Wire Ropes are built to absorb snap loads safely. They are designed to wind and rewind evenly on quick-reversing drums and travel over sheaves smoothly. Every strand on these ropes is

made from a special J&L quality-controlled steel and drawn to exacting tolerances of 1/1000". Then stranded on high-precision machinery, these wire ropes have uniform diameters that even up the wear all along the working length, reduce localized abrasion and stay on the job longer.

J&L manufactures wire rope for every purpose: Excavating, material handling, marine uses, logging, mining and oil country applications. Whatever your needs, you'll find it profitable to consult with J&L engineers *first* regarding your requirements. We maintain a complete wire rope service for every field of application. Write to: Jones & Laughlin Steel Corporation, 411 Jones & Laughlin Building, Pittsburgh 30, Penna. The coupon is for your convenience.



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**RUBEROID
INSULATING TAPE**

• Tough and waterproof, Ruberoid Insulating Tape holds its grip no matter how it's abused. For over 60 years it's been first choice for wrapping mining machine cables. Here are the reasons:—only Ruberoid Insulating Tape has all these seven important features!

1. Double grip—both sides adhesive
 2. Great tensile strength
 3. Won't tear, ravel or pucker
 4. Resists abrasion
 5. Acid and alkali proof
 6. Extra thick—one layer insulates
 7. Exceeds A.S.T.M. specifications...
- by 300% in adhesiveness
—26% in tensile strength
—290% in dielectric strength!



The RUBEROID Co.

QUALITY BUILDING MATERIALS
500 Fifth Ave., New York 18, N. Y.

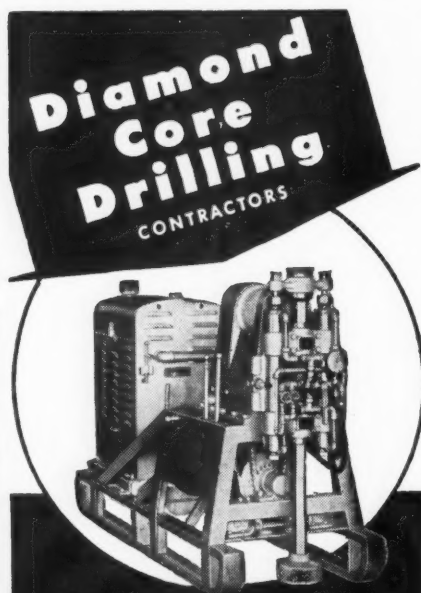


and at 1,400 r.p.m. has a torque output of 330 footpounds.

Two Mack-built transmissions, both matched to the new Thermodyne engine are available. Standard is the Mack TR-311 five-speed, direct-in-fifth transmission. The Mono-Shift TRD-313 duplex transmission, offering ten speeds and controlled by a single gear-shift lever, is available as an optional extra. With the Mono-Shift, compound shifts in either direction may be made simultaneously with the main-box shifts, according to the manufacturer, and pre-selection of compound ratios also is a feature.

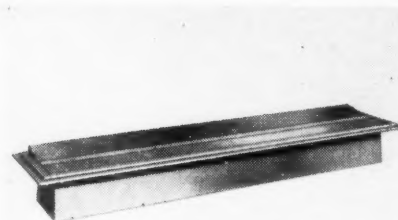
Chassis construction includes side-members of pressed carbon-steel joined by cross-members of the Mack box-girder design, said to produce a rugged frame of great strength and rigidity. According to Mack, the EQT stresses safety throughout its design and an all-steel cab offers many comforts to the driver. Seat and back cushions are of foam-rubber.

VENTILATION - TUBING REPAIR KIT—For minor repairs to its Mine Vent flexible ventilation tubing, such as holes made by flying rocks or rips caused by machinery, American Brattice Cloth Corp., Warsaw, Ind., now offers a repair kit in a handy carrying case that includes adhesive cement, a brush for applying it, Mine Vent cloth for patches, and an instruction sheet.

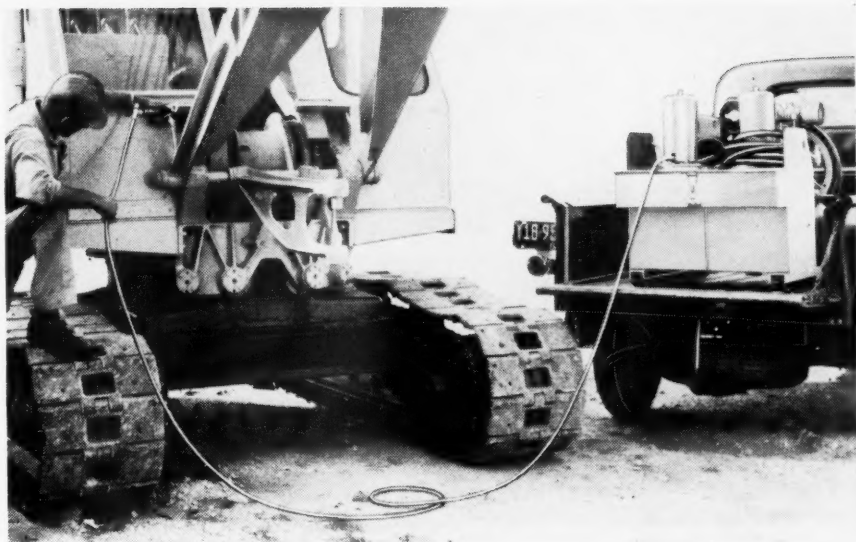


Testing mineral properties with our light gasoline drills. **SATISFACTORY COAL CORES GUARANTEED.** Ground solidification by our pre-pressure grouting method for shafts. Wetmine areas, horizontal holes for drainage. Electric drills for inside mine drilling.

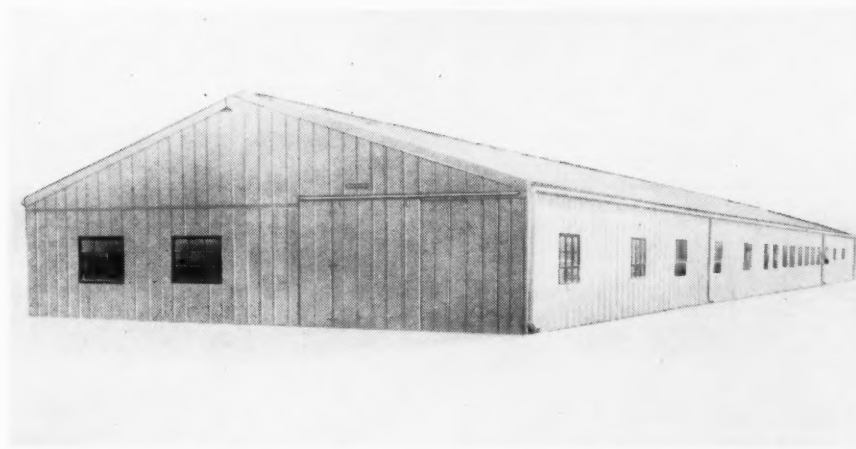
MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA



MAGNETIC SEPARATOR — Two models of its "Giant" permanent non-electric magnetic separator have been announced by the Eriez Mfg. Co., Erie, Pa. One is for stationary installation in open chutes; the other, equipped with hinges and latches for easy cleaning, is recommended for inclosed chutes. Newly designed Alnico castings provide a deep, constant uniform magnetic field and special face plates are built of abrasive-resistant steel and are furnished in either a flat or stepped pole face, according to the company. "Giant" magnets are available in sizes from 6 in. up and can be built to exact measurements of the full width of conveying lines.



MOBILE SELF-POWERED "lubrication depot" for servicing large equipment in the field is now available from the Industrial Division, Gray Co. Inc., Minneapolis 13, Minn. Known as the "Trail-Luber," the unit is available with skid mounting or as a trailer with rubber-tired-wheel mounting. Included on the unit are: a two-compartment hopper for pressure lube and gear lube; two air-operated pumps; two 20-ft. lubricant hoses with suitable adapters; one 25-ft. air hose with airline coupler, tire chuck and blower valve; a Briggs & Stratton "A" heavy duty engine, rated 1¾ hp.; and an air compressor with a 15-gal. storage tank, which delivers 7 c.f.m.

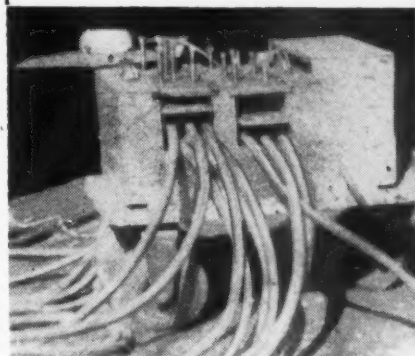


PREFABRICATED BUILDING—Its new 50-ft. wide clear-span building combines the permanency of conventional construction and the advantages of prefabrication in speed and economy of erection, according to the Steelcraft Mfg. Co., Rossmyrne, Ohio. The unit can be purchased complete with roof and side-walls of ribbed aluminum panels, or the structural frame work, with or without roof panels, is available for use with any type of masonry construction. It can be obtained in any length in multiples of 20 ft.; the height to eaves is 14 ft. Additional width can be secured by placing two or more buildings side by side and omitting interior wall panels. No special tools or skill is needed for its erection.



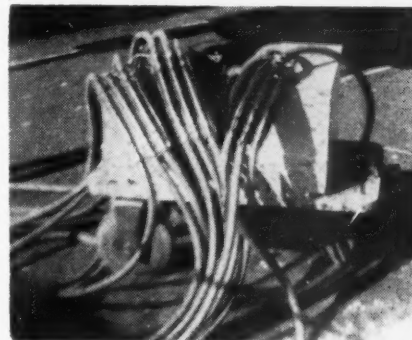
SAW—A new lightweight one-man chain saw, said to operate with equal efficiency in any cutting position, has been announced by Henry Disston & Sons, Inc., Philadelphia. The unit has an 18-in. cutting capacity and is powered by a 2-cycle, air-cooled Mercury gasoline engine delivering 3½ hp. at 4,000 r.p.m. A specially designed fuel system permits efficient operation, even when the saw is used upside down, it is said. Controls are concentrated in the pistol-grip handle.

LOW COST CABLE SPlicing FOR COAL MINES



All types and sizes of rubber-coated mine cable spliced and vulcanized.

Insulation on conductors is cured before outer jacket is applied and cured.



A service that helps lower your cable repair cost and assures greater safety.

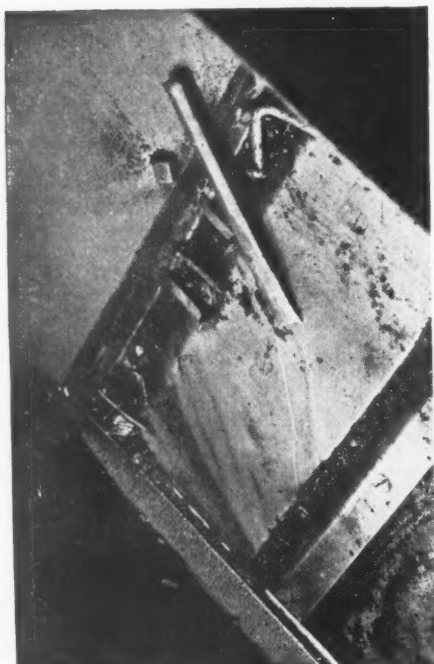
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Spout

MAGNETS

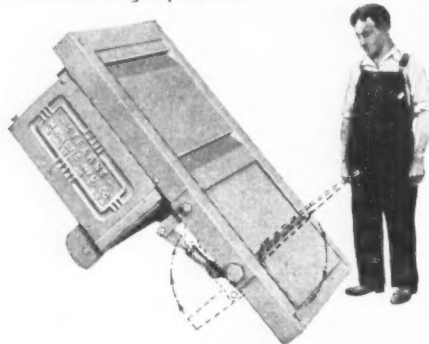
Remove the

TRAMP IRON

Tramp Iron is Bad—may ruin your machinery, hold up production, may menace safety, may cause disastrous explosions and fires, will bring damaged stoker headaches for your customers.

Stearns Automatic Spout Magnets, electrically energized for more power, will do a surprisingly fine job in catching tramp iron in your processing flow. And—the value of the accumulated scrap metal will help if not entirely pay for the magnetic equipment.

In sizes to fit your conveying system. Write for data, describe your layout, send drawing if possible.



STEARNS MAGNETIC MANUFACTURING CO.

661 S. 28th Street, Milwaukee, Wis.
SEPARATORS PULLEYS CLUTCHES BRAKES



Earthmover

The Model B Tornado dozer has been announced by the R. G. LeTourneau, Inc., Peoria, Ill., as a 25-ton high-speed machine designed specifically for dozer and pusher loading. Mounted on heavy-duty 24.00x29 ground-grip tires featuring tapered-bead construction, the 300-hp. unit offers a top speed of 13.6 m.p.h., both forward and reverse.

According to the manufacturer, the new Tournamatic transmission eliminates shifting of gears, with instantaneous speed selection of any four forward or reverse speeds. Another feature is the electrically-operated blade control, which is a 240-volt, 120-cycle a.c. Tournatorque electric motor working through a gear-reduction box. Source of electrical current is a 240-volt, 120-cycle a.c. generator built in line with the diesel engine, which

delivers power directly to the blade-control motor through magnetic contact switches. A revolving field with low voltage to the brushes is said to eliminate much of the arcing and loss of power. A current transformer delivers low-voltage current direct to the brushes in proportion to the current drawn by the hoist motor, and as a result, generator output is adequate for even the toughest blade work, the company states.

A new battery-charging system drawing power from the a.c. generator is another feature of the unit and eliminates the d.c. generator and voltage regulator, and with no moving parts to wear, is said to provide an efficient, trouble-free method of maintaining the storage batteries. Over-all dimensions of the unit are: width (blade mounted), 13 ft. 10 in.; length, 19 ft. 7 in.; wheelbase, 7½ ft.; gage 8 ft. 10½ in.

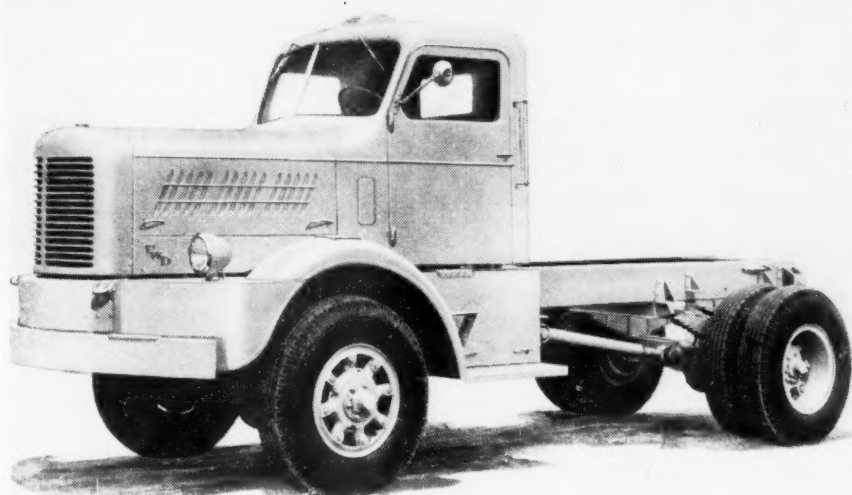


OFF-THE-ROAD TRUCK—Model LD rear-dump truck, recently developed by Euclid Road Machinery Co., Cleveland 17, is equipped with a 275-hp. diesel engine said to provide ample power for hauling capacity payloads of 60,000 lb. over rough haul roads and steep grades. Top loaded speed for this 19-cu.yd. struck-measure-capacity truck is 20 m.p.h. Tires are 18.00x32 24-ply rock-resisting type. Hydraulic steering booster is standard equipment.

FOOT-SPRAY DISPENSERS—Peda Spray Co., Inc., New York 17, has announced production of its new series "C" Peda Spray dispenser with aluminum tanks in place of the previous steel construction. The unit, which is guaranteed for 20 years against mechanical failure, ejects a mist to the

feet, resulting in a complete individual application to each person. Dilution or contamination of the solution is said to be prevented by a fully inclosed tank and a built-in drainage system.

RELAY—A new heavy-duty, rear-connected, multi-pole d.c. magnet-



Truck

A new model in the FWD line of heavy duty four- and six-wheel-drive trucks has been announced by The Four Wheel Drive Auto Co., Clintonville, Wis. Rated at 33,000-lb. gross-vehicle weight, the new Model ZU truck is newly designed and newly engineered throughout, it is said. It is powered by 140-GZ-554-cu.in. high-compression gasoline engine, which develops 188 hp. at 2,600 r.p.m. governed speed at 460 foot-pounds of torque at 1,000 r.p.m.

The new ZU offers entirely new features in advanced automotive engineering and design, according to the manufacturer. It is the first in the FWD line to feature the new FWD

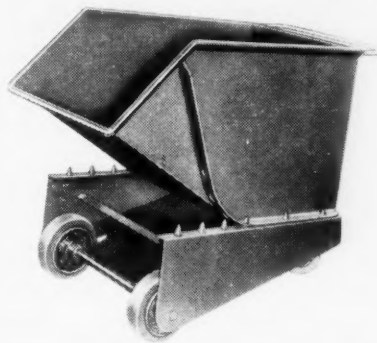
all-steel cab, which provides 30-percent greater visibility and increased driver comfort. The frame of the Model ZU is heat-treated channel steel with welded and reinforced front cross-member providing a strength factor more than 200-percent stronger than any previous FWD model, and engine supports, transmission supports, cross-members, spring brackets, etc. all are of fabricated construction providing greater strength and rigidity, it is said. Front and rear axles are reportedly of advance design, featuring 17 in. spiral bevel, ring gears and pinions for strength and quietness. The newly designed FWD "S" type constant-mesh transmission with helical gears and easy sliding jaw clutches also is provided.

operated relay, known as the AYB, has been announced by the Westinghouse Electric Corp., Pittsburgh 30, Pa. Available in 4-, 6-, 8-, 10-, 12- or 14-pole combinations, the AYB relay is designed for operation on 600 volts and below. All contacts are double break silver to silver, will carry 10 amp. continuously at rated voltage and have a maximum interrupting capacity of 150-volt amp. Its salient feature is a fast drop-out of the contacts when the coil is de-energized, according to the manufacturer.

FIRE HOSE—New "Qua-flex" rubber-lined fire hose is available from the Quaker Rubber Corp., Philadelphia 24, in lengths of 25, 50, 75 and 100 ft. and diameters of 1½, 2 and 2½ in. Said to feature light weight, with unusual strength and flexibility, the hose is protected by a light-weight jacket, woven of long staple cotton, with a laminated tube compounded of non-acid forming, slow-aging rubber that resists drying out and cracking.

GREASE FITTINGS—Lincoln Engineering Co., St. Louis 20, Mo., has announced new, improved Kleenseal bullneck-type grease fittings, available in a wide range of sizes and styles. According to Lincoln, they offer many advantages of former types of high-

pressure fittings and permit standardization on one all-purpose fitting. Couplers and grease guns now in general use may be used with them.



MATERIALS HANDLING—Improved Model SRF-½ "Phil-Dump" Junior, for hauling and dumping industrial materials, now available from Phillips Mine & Mill Supply Co., Pittsburgh 3, Pa., has over-all dimensions of 48x28x38 in. and a capacity of ½ cu.yd. It can be either hand-pushed or used with a fork-lift truck. The specially processed tires are said to afford floor protection and promote ease and economy of operation.

IT'S JUST THIS SIMPLE



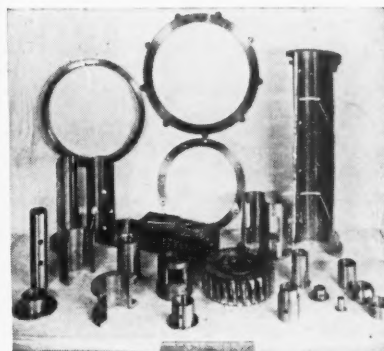
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Cost less because they wear longer—and they wear longer because there is a Specific Promet formula for every requirement.

AXLE BEARINGS JOURNAL LINERS BEARINGS and WEARING PARTS

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GOODMAN • WESTINGHOUSE
SULLIVAN • OLDROYD
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EQUIPMENT



PROMET BAR STOCK

Round, hexagon, square. Rough cast, semi-finished. Cored stock all sizes (by ⅛" steps) from ½" minimum core to 12" O.D. and 12" lengths. 6 grades of hardness.

PROMET BABBITTS

Lead or tin base. 3 grades

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PAYROLL...

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He's at your
SERVICE

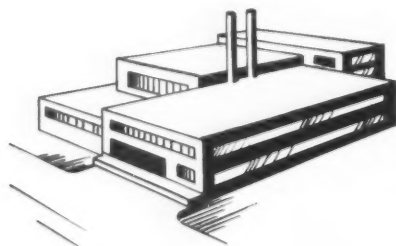


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MOTOR AND GENERATOR BRUSHES

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CARBON BRUSHES
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Diesel Engine

The Detroit Diesel Engine Division, General Motors Corp., has announced the addition of a Twin 4 diesel engine to its line of industrial power plants. The new multiple-engine unit (Model 8-103) consists of two GM Series 71 4-cylinder diesels mounted side by side on a common base and geared to a single output shaft, with 170-continuous-bhp. developed. For parts standardization and simplified maintenance, the Twin 4 has been closely patterned to the company's Twin 6 and many components are interchangeable.

According to the manufacturer, four distinctively different power take-off arrangements are available and transfer gear cases may be obtained with gear ratios of 1:1, 1.33:1, 1.76:1, or 2:1. Twin 4 units are offered with either right- or left-hand rotation and may be equipped with either electric-, air- or gasoline-starting devices.

Flexible Tubing

Greater dependability and life have been added to its flexible tubing as a result of its engineering-research program, according to the Ronaflex Tubing Co., Inc., Philadelphia 2, Pa. The improvements result from use of new Buna- and Neoprene-base synthetics, which are said to stand up under high temperatures, pressures, vibration, internal and external corrosive solvents and fumes. Elimination of leakage and maintenance troubles also are said to be features of the improved product.

According to the manufacturer, the patented, light-weight couplings provided with standard Ronaflex assemblies snap on or off in a second, saving maintenance time while providing a tight positive grip that eliminates all trouble from leaking joints. No packing or tightening is required. Standard sizes from 1/4 to 2 in. I.D., in a complete range of lengths up to 200 ft. in the small diameter and 50 ft. in the largest diameters, are available.

Industrial Notes

Mine Safety Appliances Co., Pittsburgh, Pa., has elected John T. Ryan, Jr. executive vice president. Mr. Ryan joined the company in 1936, following graduation from Pennsylvania State College and Harvard Graduate School of Business Administration and was successively sales engineer, assistant general manager and general manager.

American Car & Foundry Co., New York, has named Herman H. Pancake, formerly manager, mine car sales, manager of the company's newly created mine car and special products sales division, a consolidation of the mine car sales and miscellaneous sales divisions. Mr. Pancake's increased jur-

isdiction was announced upon the retirement of H. D. Distelhurst, manager of the miscellaneous sales division, after 43 years of service with ACF.

Lee-Norse Co., Charleroi, Pa., has appointed two sales agents to represent the company in important mining fields. R. E. Gerdetz Equipment Co., Bluefield, W. Va., R. E. Gerdetz, president, has been named to cover southern West Virginia, Tennessee and eastern Kentucky. Central Mine Supply Co., Mt. Vernon, Ill., Alfred E. Pickard, president, has been appointed to cover the states of Illinois and Indiana and western Kentucky.

Marion Power Shovel Co., Marion, Ohio, has appointed A. William McGraw a representative in sections of Missouri, Illinois and Kentucky, with headquarters at the company's district office in St. Louis. Mervyn W. Martin has been appointed sales representative for Marion in California and Nevada. Paul Fenwick has been named manager of the company's New York sales office. T. W. Bishop has been appointed sales representative in southern Indiana, western Kentucky and southeastern Illinois.

National Mine Service Co., Beckley, W. Va., has elected Louis W. Huber a vice president, in charge of all the firm's divisions and operations in Kentucky, Tennessee, Illinois and Indiana, with headquarters at 1404 First National Bank Bldg., Lexington, Ky. Mr. Huber was formerly district manager, Mine Safety Appliances Co., in charge of mining sales in Kentucky, Tennessee, Indiana and Illinois.

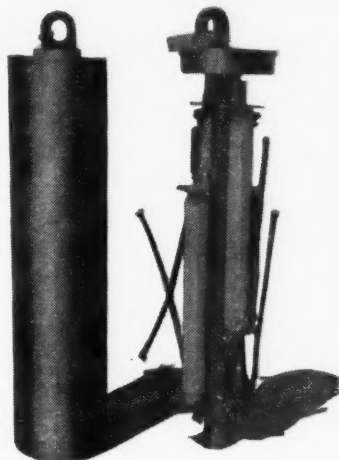
Hewitt Rubber Division, Hewitt-Robins, Inc., Buffalo, N. Y., has named Charles W. Mackett to the newly established position of manager of sales operations. Mr. Mackett, who has been associated with the company for 32 years, was formerly assistant sales manager of the division.

Euclid Road Machinery Co., Cleveland, Ohio, has appointed J. M. (Jack) Fairbanks service manager, to succeed D. R. Anderson, named branch manager of the company's office in Hibbing, Minn. Mr. Fairbanks has been with Euclid for over 10 years in various capacities and was formerly general foreman of its St. Clair assembly plant.

Gould Storage Battery Corp. has named Fred W. Roth to the post of vice president in charge of Trenton Plant Operations for the company. Mr. Roth was works manager of the Trenton plant of the Storage Battery Division, Philco Corp., when that division was merged with Gould in June, 1947.

Bemis Bro. Bag Co., St. Louis, has established a new sales office in Cleveland, in charge of Neely J. Leake, in order to offer better service to customers in Northern Ohio. Mr. Leake, who has been with the company for 28 years, is assisted by Robert C. Thomas,

SHUTTLE CAR RESISTORS



Illustrated, GUYAN replacement elements for permissible shuttle-car traction motors . . . fits in original case and mountings. Resistor available for all type shuttle car traction and reel motors.

GUYAN Try us for long-lived, trouble-free resistors.
MACHINERY COMPANY
LOGAN, WEST VIRGINIA



"Quit beating your brains out, Fatty . . . even I can't get through a **BEE-ZEE** screen."

KEEP COAL FROM ESCAPING WITH BEE-ZEE SCREENS

Save your coal from slipping away—by using Bee-Zee long-life screens on every job. Round bar construction keeps the opening size always the same until the bar is worn halfway through. That gives you longer screen life—big coal savings. Look into Bee-Zee screens now. It pays!



BIXBY-ZIMMER
ENGINEERING CO.
961 Abingdon St., Galesburg, Illinois

sales representative. C. W. Akin, until recently sales manager of the company's plant at St. Helens, Ore., has been transferred to its St. Louis general sales office.

Kelso-Burnett Electric Co., Chicago, has announced the addition of E. T. Groat, formerly district mining specialist for the General Electric Co., in the Chicago area, to its executive staff as vice president. Mr. Groat, who has been with G. E. for 26 years, has recently been specializing on power installations in the coal, oil and mining industries.

R. G. Le Tourneau, Inc., Peoria, Ill., has named Harry R. Powers, active for over 23 years in construction-equipment sales and service, eastern sales manager, succeeding E. M. Ferguson, resigned.

Pennsylvania Rubber Co., Jeanette, Pa., has appointed James M. Hughes assistant sales manager. Mr. Hughes has been associated with Good-year Tire & Rubber Co. for the past 12 years, in sales and operating work.

Link-Belt Co., Chicago, has begun construction of a modern new plant on a 10-acre plot in Houston, Texas. The project will include a one-story, all-steel factory building with three bays, and a two-story office section. The plant proper will have a modern machine shop, structural steel shop and large warehousing facilities. This new plant, comprising approximately 45,000 sq. ft. of floor space, is being built to better serve the expanding industries of the Southwest.

E. D. Bullard Co., San Francisco, a pioneer in industrial safety equipment, is celebrating a half-century of operation this year. Since its establishment in 1898, the company has been concerned with development, manufacture and distribution of safety equipment. In 1919 Bullard originated the original "Hard Boiled Hat." The company's slogan, "Everything in Safety," is based on some hundreds of safety equipment items manufactured or distributed.

Raybestos-Manhattan, Inc., Passaic, N. J., has appointed Littleton C. Barkley general sales manager, asbestos and rubber products of its West Coast Division. Mr. Barkley, who has been with the Manhattan Rubber Division for 23 years, has been until recently its sales manager for mechanical rubber products.

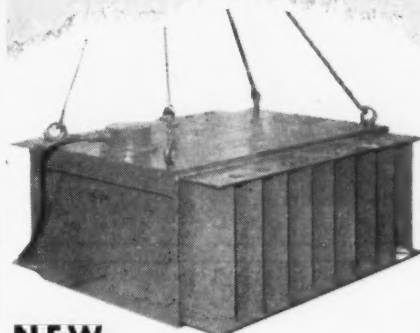
Manning, Maxwell & Moore, Inc., New York, has acquired the Hydraulics Division of the Airex Mfg. Co., Long Island City, N. Y., and will develop industrial applications for Airex Hydraulics products in addition to the present hydraulic line of Airex relief valves, filters, and pneumatic pressurizing valves for the aircraft industry. Norman Collins, Airex hydraulic engineer, has joined Manning, Maxwell & Moore, together with other key Airex personnel.

Timken Roller Bearing Co., Rock Bit Division, recently marked the opening of its new plant at the foot of

TRAMP IRON

Removal

on the "WORLD'S HIGHEST ESCALATOR" takes the "WORLD'S STRONGEST MAGNET"



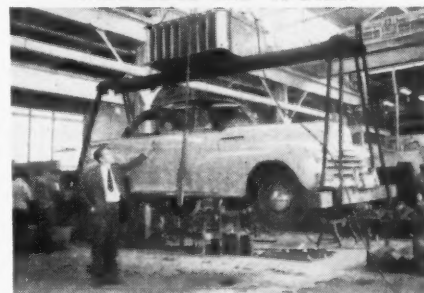
NEW

DINGS

RECTANGULAR
SUSPENDED
MAGNET

Imagine the magnetic power necessary to pull tramp iron out of the coal on the "World's Highest Escalator" . . . a 42" single belt running from a 656 ft. working level to the top of the 73 ft. tippie . . . delivering 1000 tons of coal per hour . . . WITH THE MAGNET 18" FROM THE BELT . . . as close as it could be placed! Dings "imagineered" it . . . and built the world's strongest magnet, a triple pole design combining high surface strength with great depth of penetration. Factory tests prove it has 200 GAUSS AT 24" FROM THE SURFACE! That's Power That Pays in assuring maximum protection from tramp iron.

Here's the **POWER** that does the **WORK!**



Extra coil windings provide extra power that easily holds many times the weight of an automobile . . . attracts and holds the largest pieces of tramp iron. Uniform flux pattern across entire magnet face eliminates dead spots. Side fins and internal aluminum extensions from coil to case dissipate heat generated. Simple to install . . . low operating cost . . . negligible maintenance . . . allows heavier belt loads at higher speeds. There's a place in YOUR mine for Dings rectangular magnets, as powerful as you need them. Write for details today.

DINGS MAGNETIC SEPARATOR CO.

4720 W. McGeogh Ave.
Milwaukee 14, Wis.

Dings
"HIGH INTENSITY"

Pikes Peak with a dinner and reception attended by 200 business leaders from the Rocky Mountain area. At an "open house" during the day, 2,000 Colorado Springs citizens were shown through the plant and served refreshments. Initial output of the plant is 10,000 rock bits a day.

U. S. Steel Supply Co. has appointed William A. Hunt manager of its Kansas City sales office. A salesman in the St. Louis district for the past several months, Mr. Hunt was formerly with Carnegie-Illinois Steel Corp.

Carnegie-Illinois Steel Corp. has announced the resignation of Thomas J. Hilliard, sales vice-president. A lifetime resident of Pittsburgh, Mr. Hilliard joined Carnegie-Illinois in 1936 as manager of sales for the Pittsburgh district, was made general manager of sales in 1938 and was elected vice president in 1945.

Rome Cable Corp., Rome, N. Y., has acquired an interest in the Anderson-Carlson Mfg. Co., Torrance, Calif. Sales of electrical metallic tubing and allied products to be manufactured in the plant as soon as equipment installation is completed will be handled by the Rome Cable Corp. through its own sales outlets. The addition of these Anderson-Carlson products to Rome's regular line of wires and cables is expected to provide a more complete and convenient service to industry in the west coast area.

Gordon Lubricating Co., Carnegie, Pa., terminal distributor of RPM oils and lubricants, has announced the appointment of Schneider and Young, Inc., Harrisburg, Pa., as the distributor of the RPM line of automotive oils and lubricants for the Harrisburg, Carlisle, Lewistown, and Lebanon districts.

Trade Literature

Available Without Charge on Request to the Manufacturer

CENTRIFUGAL PUMPS—De Laval Steam Turbine Co., Trenton 2, N. J. Catalog No. 83-29 contains information for all G, I, K, L, M and P single-stage single- and double-suction pumps, and presents outstanding features of De Laval design and construction, lists pump ratings and essential dimensions. Brief descriptions of such optional features as mechanical shaft seals, self-priming systems and vertical mountings are included.

EARTHMOVING—Koehring Co., 3026 West Concordia Ave., Milwaukee 10, Wis. Bulletin "Cutting Haul Costs with Koehring Dumpsters," describes and illustrates use of the Koehring Dumpster for low-cost off-road material hauling. Booklet includes time study results, production charts, specifications, mechanical features and many on-the-job photographs.

GEARMOTORS—Link-Belt Co., 307 North Michigan Ave., Chicago 1. Book No. 1815 covers double- and triple-reduction units with integrally mounted electric motor, in standard sizes of 1 to 30 hp., and an output speed range of 280 to 6 r.p.m. The catalog tabulates the various sizes available; gives dimensions and average weights; styles of mountings; load-classification and selection tables; and dimensions of slide rails.

BAR STEEL—Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80. Bulletin describes RY-AX, a heat-treated carbon-manganese hot-rolled bar steel said to represent an improvement over former steel bearing that same name. Mechanical properties, hardness readings, machinability rating and typical shafting, axle and other applications are detailed.

SCRAPER—LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa. Bulletin No. A1154 illustrates and describes LaPlant-Choate's TS-300 motor scraper, with views of the machine in action, details of its construction and detailed specifications.

CENTRIFUGAL PUMPS—Nagle Pumps, Chicago Heights, Ill. Bulletin No. 4711 covers design, construction and performance of its line of two horizontal- and three vertical-shaft centrifugal pumps said to be especially suited to applications that include pumping corrosive or hot liquids and abrasive or heavily laden mixtures. Special types recently developed for various applications also are presented, along with five classes of Nagle impellers and recommendations for various applications.

WELDING—Hobart Bros. Co., Troy, Ohio. Vest pocket welders' guide includes such useful information as characteristics of various welding arcs, four essentials of proper welding procedures, type of joints, typical positions, chart of standard steel shapes, photographs of good and bad welds, causes of common welding troubles and what to do about them, welding symbols, and an easy-to-use table of "How to Find" formulas.

DIESEL-ELECTRIC SWITCHING LOCOMOTIVES—Apparatus Department, General Electric Co., Schenectady, N. Y. Bulletin No. GEA-4909 presents case histories and operating results for typical GE diesel-electric switch locomotives, along with brief specifications for units ranging from 25 to 80 tons.

CENTRIFUGAL PUMPS—Worthington Pump & Machinery Corp., Harrison, N. J. Bulletin No. W-305-B1 provides construction details, specifications, ratings, dimensions, installation and other data on the company's types CN and CNE centrifugal pumps, for belt, multi-V or motor drive.

FINANCING SERVICE—CIT Corp., 1 Park Ave., New York. Booklet, "Working Capital for Industry," presents a case history of the company's service in providing necessary working capital for the expansion and modernization of a manufacturing organization.

ALTIMETER—Wallace & Tiernan Products, Inc., Beileville 9, N. J. Bulletin describes the new W&T precision altimeter, a low-range surveying altimeter said to determine elevations accurately in about one-tenth the time required by vertical angle or spirit leveling. It has a range of 2,000 ft. and may be easily read to the nearest foot.

FLOOR RESURFACING—Stonhard Co., 403 North Broad St., Philadelphia 8. Maintenance manual, "Over the Rough Spots," provides information on patching holes and ruts and resurfacing any type of floor quickly and simply.

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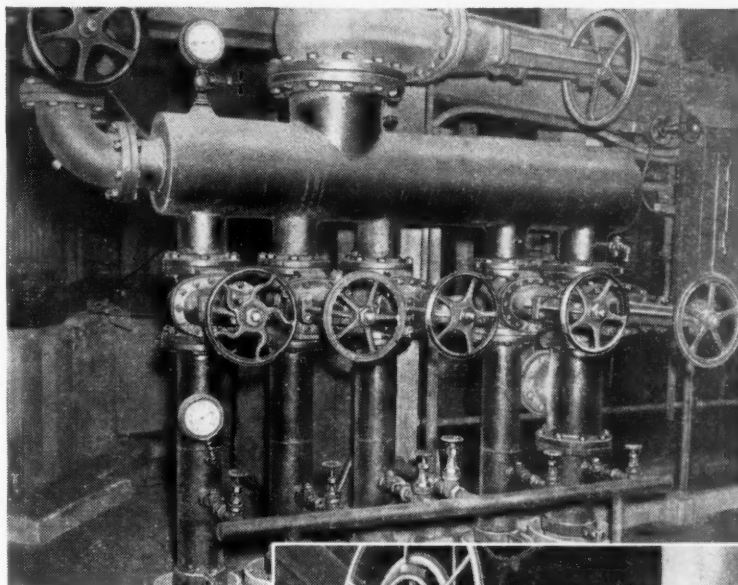
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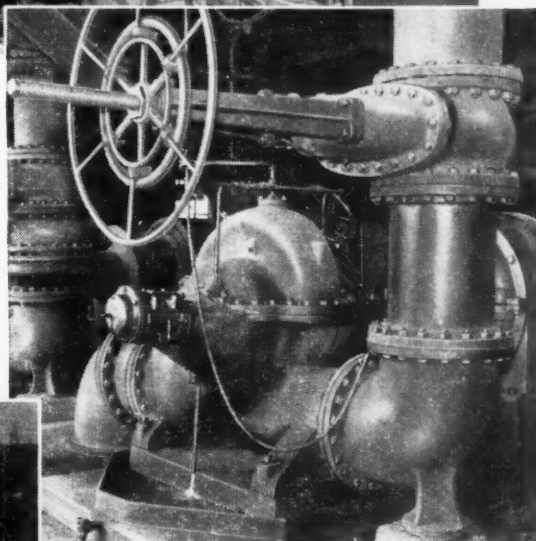
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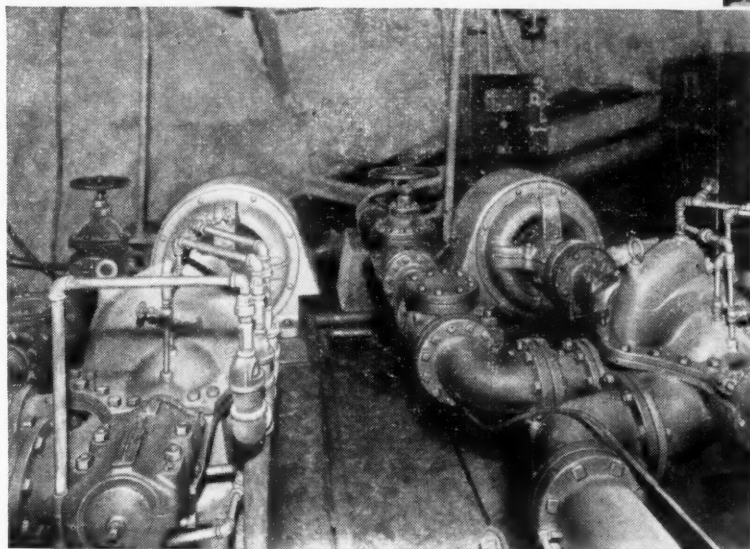
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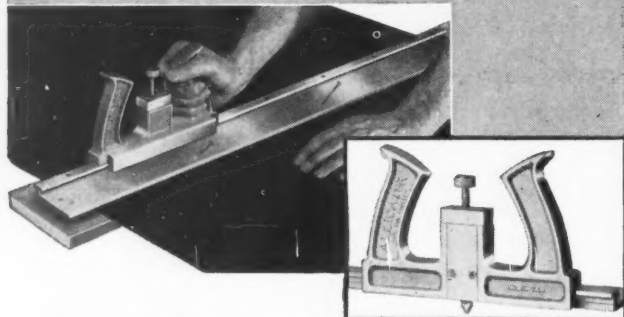
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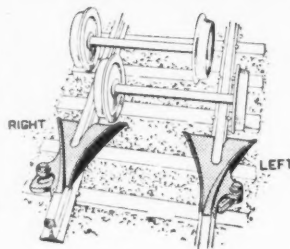
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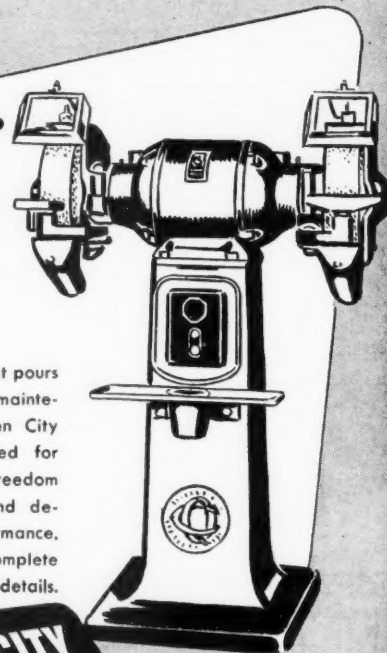
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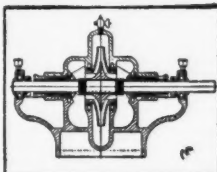
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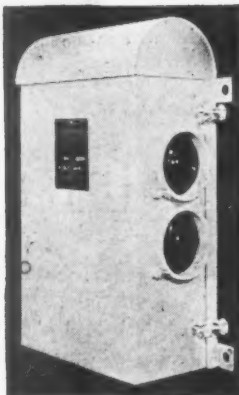
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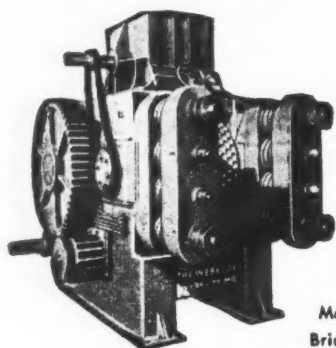
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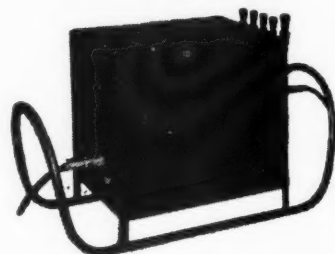
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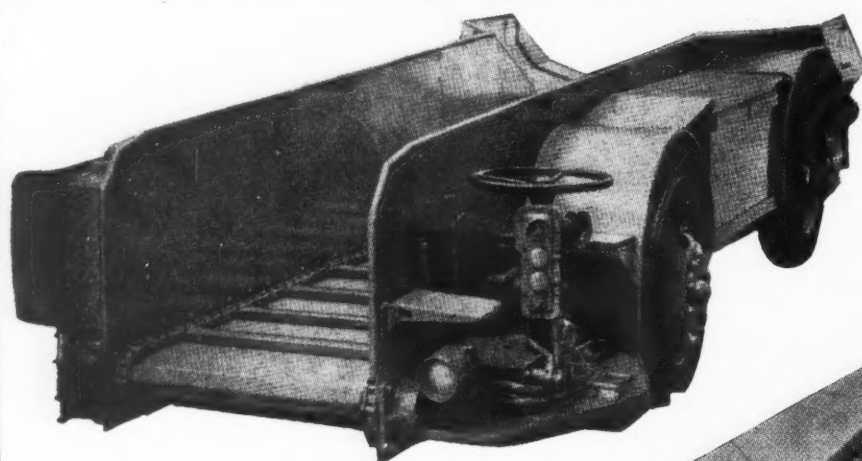
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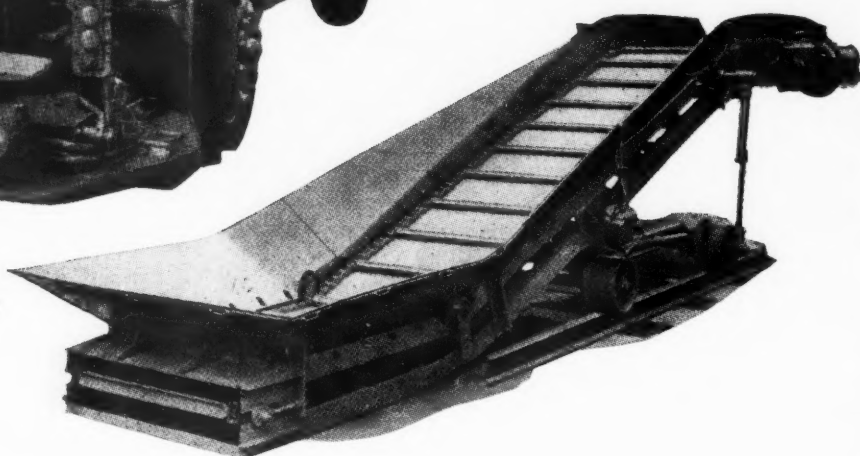
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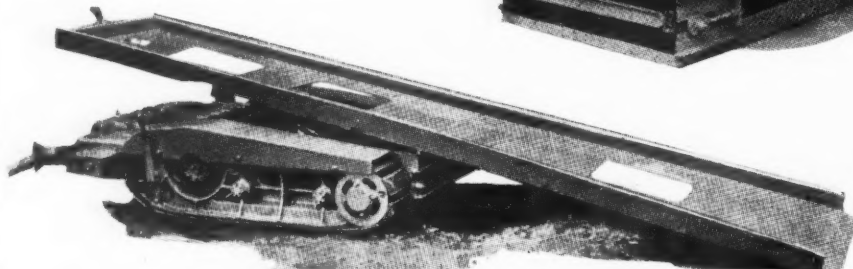
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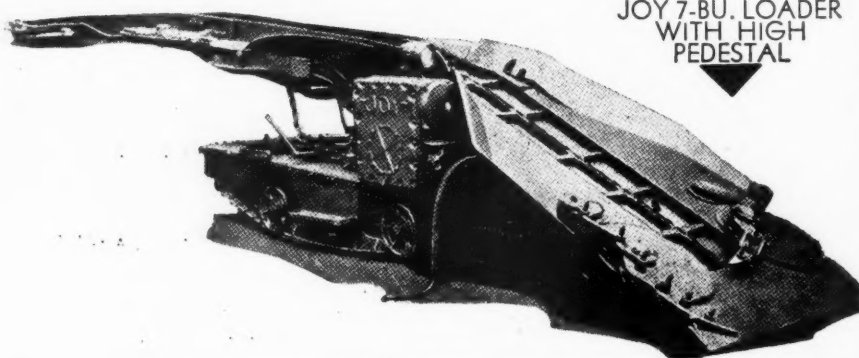
RIGHT:
JOY
SHUTTLE CAR
WITH ELEVATING
CONVEYOR



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TROLLEY HARDWARE—Hangers, clamps, frogs, switches, roof hangers.

TRANSMISSION WIRE—Single conductor, 2 conductor, 3 conductor—Neoprene, glass, rubber insulated 2/0 to 500,000 CM. New.

JOY 7-BU. LOADERS—Caterpillar mounted with high pedestal.

SHUTTLE CARS—Joy 42D storage battery.

ELEVATOR CONVEYORS—Joy.

AIR COMPRESSORS.

MACHINE SHOP—Complete.

ELECTRIC SHOP—Complete.

CARDOX PLANT—Complete.

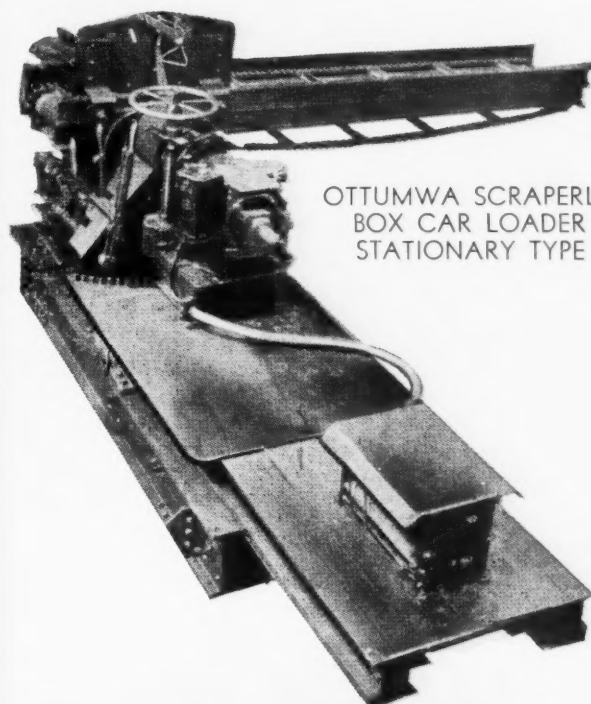
BATTERIES—Exide and Gould Ironclad, 24 cells.

\$150,000.00 WORTH of new parts, bearings, gears, bolts, nuts and screws for Joy, Jeffrey, Goodman, Ottumwa, Manerre, General Electric, Westinghouse, Demming, and other popular manufacturers' equipment.

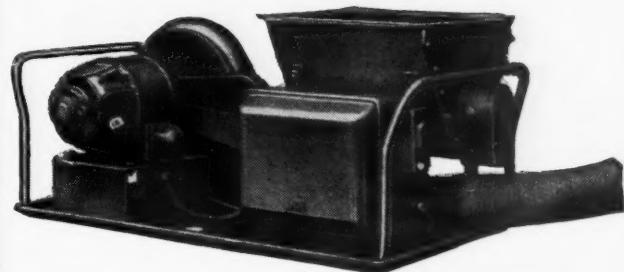
ROTARY CAR DUMPER for 36" gauge Cars With Automatic Control.

HOISTS—1 Double Drum Conical Hoist—Denver Engineering Works—300 HP., Silent Chain Drive, Complete With All Panelboards, Transformers and Controllers and Numerous Others.

ALSO THOUSANDS OF ITEMS TOO NUMEROUS TO MENTION



OTTUMWA SCRAPERLINE
BOX CAR LOADER
STATIONARY TYPE



MINE SAFETY APPLIANCE CO.
ROCK DUSTER



GOODMAN TYPE 112
SHORTWALL COAL CUTTER

WRITE FOR OUR COMPLETE LIST OF MACHINERY AND EQUIPMENT

250 VOLT BALL-BEARING LOCOMOTIVES

- 4—8-ton Goodman, Type 32-A-1-4-T
- 4—6-ton Westinghouse, Type 905-L
- 5—6-ton General Electric, Type HM-801
- 3—8-ton General Electric, Type HM-819
- 2—8-ton General Electric, Type HM-707
- 4—8-ton General Electric, Type HM-839

The above Locomotives are from 36" to 48" gauge. All are equipped with CY-21 motor-driven gathering reels and 500' of practically new cable. All are rebuilt. Can make immediate shipment.

600 END-DUMP 3½-TON STEEL MINE CARS

Height overall—46"
Length of body—9'
Overall length—10'2"
18" Timken roller bearing wheels
Wheel base—36"
Width—64"
Axles—3"

Steel bodies—3/16"
Drawbar—1" x 4"
Oak bottoms—3/4"
3—Link couplings
3—Binders
Spring draw head one end
Track gauge—42"

AC CUTTING MACHINES

- 5—Goodman Universal 112-G3, 3 phase, 60 cycle, 220/440 volt, on self-propelled tracks.

LATE TYPE GATHERING REELS

- 5—Practically new General Electric motor-driven Gathering Reels, Type MVR-42-F5, Reel Motor Type 301-E2, with 500' of practically new cable.
- 3—CY-21 motor-driven Reels with 500' of cable.

250 VOLT COAL CUTTING MACHINES

- 3—New Jeffrey 29-L Low Vein Type Track Cutters, 30" tramming height.
- 1—Jeffrey 29-U Universal Track Cutter, less than two years old.

AC LOADING MACHINES

- 3—8-BU Joy Loading Machines on cats, 42" gauge.
- 6—7-BU Joy Loading Machines on cats, 42" gauge.

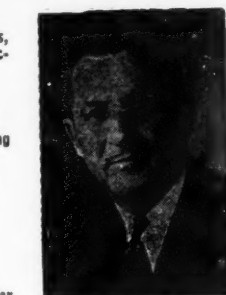
ELECTRIC HOIST

- 1—1650 HP Shaft or Skip Hoist, Fly Wheel Set, 7' small diameter by 11' large diameter, cylindro-conical drum, 300' 1½" rope capacity, practically new unit. Complete specifications on request.

We Specialize in Buying Complete Mines That Are Going Out of Business
Or From Receivers in Bankruptcy, Administrators of Estates, Etc.

COAL MINE EQUIPMENT SALES CO.

306-307 BEASLEY BUILDING



Frank J. Wolfe

TERRE HAUTE, INDIANA

COAL CUTTING MACHINES

- 1—35 B Jeffrey Shortwall, 250 V, D.C.
- 1—35 BB Jeffrey Shortwall, A.C.
- 1—29C Jeffrey Arcwall, 250 V, D.C.
- 1—124 E.J. Goodman Slabbing, 250 V, D.C.
- 1—112 C.A. Goodman, 250 V, D.C.
- 1—28 A Jeffrey Shortwall, 250 V, D.C.

LOCOMOTIVES

- 1—25 ton GE Haulage Locomotive.
- 1—13 ton West. 908 C Motors, steel frame.
- 1—10 ton West. bar steel frame, 250 V, 907 C Motors.
- 1—10 ton GE HM839 Motors with blowers.
- 1—8 ton GE HM839, 500 V motors.
- 2—6 ton GE steel frames, HM823, 250 V Motors.
- 1—6 ton West. bar steel with 904 Motors, 250 V.
- 2—30 B Goodman "Doodle Bugs," 42" gauge.

M. G. SETS

- 1—60 KW, 250 V, D.C. with 100 HP Synchronous motor.
- 1—75 KW, 250 V, D.C. with 112 HP, Synchronous motor.
- 1—100 KW Ridgeway, 275 V, D.C. 3/60/2200 V Synchronous motor.
- 1—150 KW, Ridgeway, 275 V, D.C. 3/60/2200/1200.

LOADING MACHINES

- 1—200 KW, Allis Chalmers rotary converter.
- 1—L-600 Jeffrey Loading Machine, track mounted, 250 V, DC. 42" track gauge.
- 2—L-400 Jeffrey, same as above.
- 2—260 Goodman, 250 volt, 44" track gauge, track mounted.
- 2—7 BU Joy Loading Machines, 3 phase, 60 cycle at 220/440 volt.
- 1—14 BU, 250 volt Joy Cat mounted loading machine.
- 2—Shuttle Cars, complete with battery.

Tippins Machinery Co.
Pittsburgh 6, Pa.

CRAWLER AND LOCO CRANES

- 1—25 ton Marion Diesel Crawler 1½ yd. shovel front D/L attachm'ts, 60' bm. D13000 Caterpillar Diesel engine, 33" cat, first class condition.
- 1—¾ yd. same as above, Marion No. 332.
- 2—¾ yd. Buckeye Gas Shovels and Cranes.
- 1—Link Belt K45 Crane and D/L 70' bm. Wise.
- 1—2½ Yd. Koehring Diesel D/L Crane with 80' boom.

MINE AND SLOPE HOISTS

- 1—40000# Vulcan Dbl. Drum AC.
- 1—35000# Nordberg Sgl. Drum AC.
- 1—10,000 lb. cap. Vulcan Sgl. Drum Hoist 4' x 4" drum 250 HP, AC.
- 1—5,000 lb. cap. Lidgerwood Sgl. Drum Electric Hoist, 600 FPM, GE motor, 100 HP, AC.

HOIST MOTORS

- 1—200 HP, GE 2300/3/60 AC 585 RPM Motor with control.
- 1—225 HP, GE Motor for 440/3/60 AC, 585 RPM with control.
- 1—300 HP new Allis Chalmers slip ring motor 600 RPM for 2300/4000 AC.

CONVEYORS

- 1—1275 ft. 42" belt Conveyor with drive.
- 1—300 ft. 60" ditto.
- 1—275 ft. 48" ditto.

CRUSHERS

- 1—24 x 24 Dbl. Roll Crusher.

DIESEL MOTORS

- 3—6 cyl. 280 HP Cummings Diesel Motors.

GENERATING UNIT

- 1—750 KVA Westhse 440/3/60 AC Generator with Nordberg Uniflow Steam Engine, complete. Bargain.

AERIAL TRAMWAY

- 1—Aerial Cable Tramway, 1250 ft. long x 1½" rope with haul rope. Motor 60 HP, AC.

COMPRESSORS

- 1—600 ft. Ir. 2 stage motor driven compressor, Imperial Type for 220/440/3/60 AC.
- 1—900 ft. Sullivan WJ Angle Compound Compressor with 150 HP, GE Motor, 220/440/3/60 AC.

DERRICKS

- 1—25 ton, 3 drum Stiff Leg Derrick with 90' bm. AC.

HAWKINS AND CO.

154 So. Michigan Ave. Chicago 3, Ill.
Phone: HAR. 0725

AIR COMPRESSORS:

- 12—Belted 360, 676, 870, 1000, 1300 ft.
- 12—Diesel 105, 315, 520, 676 & 1000 ft.
- 6—Electric 1300, 1500, 2200, 5000 ft.

CARS & LOCOMOTIVES:

- 65-Ton G. E. Diesel Elec. Locomotive.
- 100—50 ton cap. Condolas.
- 35—50 ton cap. Flat Cars.
- 8—100-ton, 45-ton, 30-ton Diesel Locomotives.
- 6—10, 16, 20 & 30 ton Gas Locomotives.
- 150—8000 & 10000 gal. cap. Tank Cars.
- 20—12 yd. Std. ga. Steel Dump Cars.
- 1—50 ton G.E. Diesel Elec. Locomotive.

RUBBER CONVEYOR BELTS:

- 1000', 60", 600', 30", 300', 20", 1000', 42", 900', 48", 1450', 36", 1200', 24", 900', 18", 600', 16", 350', 14".

ELECTRIC LOCOMOTIVES:

- 15—3, 5, 8 ton Battery & Trolley.
- 12—100, 150, 180 & 480 K.W.

DIESEL GENERATORS:

- 17—GD9, Elmco 21, Conway 20, 50, 80 & 75 and Sullivan H13.

STEEL TANKS:

- 6—50,000 and 100,000 gal. Tanks on tower.
- 30—8000, 10,000 and 20,000 gallon capacity.

SHOVELS—DRAGLINES:

- 7—1 yd., 1½ and 2 yd. Gas & Diesels.
- 16 yd. Elec. 160 ft. Boom Dragline.

R. C. STANHOPE, INC.

60 E. 42nd Street New York 17, N. Y.

STRIPPING & MINING EQUIPMENT

Coal Crushers • Vibrating Screens
Conveyors • Electric Coal Drills
Electric Generator Sets • Mine Fans

THE INDUSTRIAL EQUIPMENT CORP.

(Established 1902)

910 First National Bank Bldg.,
Pittsburgh 22, Pa.

Warehouse: Carnegie, Pa.

NEW and REBUILT STORAGE BATTERY

LOCOMOTIVES

1½ to 10 Ton 13" to 56" Track Gauge

GREENSBURG MACHINE CO.
Greensburg, Pa.

AIR COMPRESSORS

- 2—175 CFM Inger, Rand 2 cyl. vert. 150 P.S.I. Type XIV dir. con. to G.E. 50 HP DC motor, 230 V. 400 RPM. Mounted on factory cast iron base. Complete with inter-cooler, unloader and access.

PHILADELPHIA TRANSFORMER CO.

Box 568 Dalton, Pa.

HIGH GRADE TOOLS

- 30" King Vertical Boring Mill, 1 Head.
- 24", 36" & 42" Bullard Vertical Turret Lathe.
- 1—C & L Model "A" Hydraulic Surface Grinder.
- 3" Bar Fostick Horizontal Boring Mill.
- 3½" Bar Lucas Horizontal Boring Mill.
- 2½" Giddings & Lewis Horizontal Boring Mill.
- 2 1/3" Giddings & Lewis Horizontal Boring Mill.
- 18"x10" Boye & Emmes Lathe.
- 30"x12" Boye & Emmes Lathe.
- 28"x16" American Geared Head Lathe.
- 2" to 6" Plain Radial Drills.
- 21" Cincinnati Bickford Upright Drill.
- 16" and 24" C & E Shapers.
- 24"x24"x8" Gray Planer, 1 head.
- 30"x30"x10" Cincinnati Planer, 2 Heads.
- 150-ton Wheel Press.
- New No. 3 Davis Keyseating Machine.

Also various other machine tools.

Send us your inquiries

Cincinnati Machinery Company, Inc.
217 E. Second St. Cincinnati 2, Ohio

WESTINGHOUSE TYPE SK—MOTORS

WIRE INQUIRIES COLLECT

MOTORS, GENERATORS, TRANSFORMERS



1—1500 H.P.
Bought and Sold
New and Rebuilt

ELECTRIC EQUIPMENT CO.

Rochester 1, N. Y.

ANOTHER BIG REDUCTION

WE HAVE AGAIN REDUCED PRICES ON PRACTICALLY EVERYTHING
AND ARE NOW PASSING THIS SAVING ON TO YOU

COAL CUTTERS

- 4—Sullivan CE-7 AC Short Wall, complete with Standard and Tip-turn Trucks, most machines with Power Cable.

TROLLEY LOCOMOTIVES

- 2—7½ Ton Goodmans, 36" Gauge, 250 Volt D.C.

MACHINE SHOP EQUIPMENT

- 2—Drill Presses 16" to 26".
- 1—200 Amp. Smith Welder—on wheels.
- 1—18" Gould & Eberhardt Shaper.
- 1—Power Hack Saw, B.D.
- Belt & Pipe Threaders, Chain Blocks, Swing Cranes with Crawls, Wood Planer, Saw Table, Hand Shears, etc.

COAL WASHING EQUIPMENT

- 2—Rheolaveur Launderers, complete with Steel Supporting Frame.
- 1—60" Dia. Dividing Table, direct connected to 2 H.P. D.C. Motor.
- 1—Galigher Auto. Sampler with adjustable stroke & direct connected to a 1/6 H.P. Motor.
- 1—12' x 10' Steel Hopper Bin.
- 1—70' x 12' Dorr Thickener Tank, complete with mechanism.

COAL CRUSHERS

- 1—36" St. Louis Ring Type.
- 1—24 x 20 Jeffrey Swing-Hammer Mill.

PUMPS

- 1—2" Marsh, V-Belted to 15 H.P. Motor 150 GPM, 160' Head.
- 2—10 x 10 Allis-Chalmers Centrifugal, 1500 GPM, 56' Head, direct connected to a 100 H.P., 2300 Volt Center Drive Motor.
- 5—5 x 5 Deming Oil-Rite Piston Pumps—Motorized.

RAILROAD SCALES

- 3—100 Ton Fairbanks, Steel I Beam Stringers, Inspected by W. W. & I. B. in April, 1947.

GENERATORS

- 1—25 KW Crocker-Wheeler, 250 Volts DC, V-Belt Drive.
- 1—96 KW G.E. A.C., 2300 Volts, direct connected to 14 x 17 Corliss Engine.
- 1—15 KVA Ft. Wayne, A.C., 480 Volts.

MOTORS

- 1—125 H.P. G.E. Synchronous AC, 2300 Volts, with Auto. Switchboard.
- New and Used AC Motors, 1½ H.P. to 40 H.P.
- Used DC Motors, 10 H.P. to 75 H.P.

DIESEL GENERATORS

- 5—D-13000 Caterpillar Diesel Engines, direct connected to 92.5 KVA 440 Volt A.C. Generators.
- 1—D-4400 Caterpillar Diesel Engine, v-belted to 30 KVA 220 Volt A.C. Generator.

CONVEYORS

- 2—24" Belt Conveyors, 15' to 75' Centers, 2 equipped with Ding's Pulleys.
- 1—30" Belt Conveyor, 70' Centers.
- 1—28" Apron Conveyor, 21' Centers.
- Flight Conveyors from 12" to 30" up to 150' Centers.

RAILS

- 50 Tons—65# Relayers.
- 25 Tons—40# Relayers.

MINE FANS

- 1—8-H60 Aerodyne Exhausting Fan, with Air Locks, Hood, etc., 75 H.P. Motor—Purchased new in 1942.

HOISTS

- 1—No. 22 Vulcan, with Man Cage, 30' Steel Head-frame and 40 H.P. Single Speed Elevator Type Motor, equipped with Solenoid Brake. (Hoist purchased new in 1942.)
- 1—Single Drum Gasoline Hoist, direct connected to 25 x 4¼ Wisc. Gas. Engine.
- 1—15 H.P. Single Drum Hoist, direct geared to motor with Controller and Grids.

LARRY CARS

- 4—Connellsville Larry Cars, Trolley Operated, 6 Ton Capacity.

PIT CARS

- 160—Card Iron Works R. B. Pit Cars, 36" Ga.
- 1—Card Iron Works Rock Car, 90 Cu. Ft. Cap.

TRACTORS

- 2—50 Diesel Caterpillar Tractors, with angle dozers.

MISCELLANEOUS

- R.C. Stranded Copper Wire, 2/0—4/0 & 350,000 CMS.
- Trolley Wire 2/0 & 4/0 Rd. & Fig. 8.
- Trolley Hangers and Supplies, New and Used.
- Wall Telephones, Jacks, \$20,000.00 worth of New Supplies.
- New CE-7 Sullivan Coal Cutter Parts.
- New and Used Wire Rope, ¾" to 1¼".
- 750' New 3-Cond. No. 6 All Rubber Power Cable.
- 1—3,000' Tramway, complete with buckets, etc.
- 1—750' Jig-back Tram, complete with motor.
- Office Equipment, Electric Calculators, Typewriters, Desks, Filing Cabinets, etc.
- 1—Stiff-Leg Derrick, with crabs and cable.
- 3—Steel Lockers, 6 and 9 Compartments.
- 6—200 Gal. Galvanized Oil Tanks.
- Bucket Elevators.
- 1—50 H.P. Cutler-Hammer DC Controller, with 2 Banks, Grids, Panel, etc.
- Switchboard Equipment for DC Motors.
- Fire Extinguishers—1 Qt. to 5 Gal.
- 5—Permissible Type all service gas masks and 38 Permissible Cannisters.
- Double and Single Electric Gongs.
- 1—Ro-Tap Testing Shaker.
- 1—No. 5 Buffalo Forge Blower, direct connected to 3 H.P. A.C. Motor.

OUR NEW SPRING BULLETIN NO. 9 AVAILABLE FOR MAILING ABOUT APRIL 15th—
COPIES SENT UPON REQUEST.

FLORENCE
MACHINERY AND SUPPLY COMPANY
SUITE 904, EQUITABLE BUILDING DENVER 2, COLORADO

C. J. Parrish, Mgr.

Phone: Alpine 2803

Yards: Denver and Florence, Colo.

MOORHEAD

ELECTRICAL MACHINERY CO.
PITTSBURGH 19, PA.

M-G SETS—ROTARIES

(3 ph. 60 cy.)
500 KW West. factory built M G Set—running inspection—consisting of 500 KW 250 v. 900 RPM cpd. interpole dir. conn. common base 714 HP Syn. Motor 8 P.F. 2300 v. with manual starting panel including magnetic excitation relays, also standard DC Panel. Good condition. Immediate shipment.
300 KW 250 v. G.E. 600 RPM Rotary Bare.
300 KW 250/125 v. con. 2-150 KW West. SK 125 v. Gen. dir. con. 450 HP Motor.
150 KW West. 125 v.—250 HP Ind. 2200 v.
100 KW 125 v. Burke—150 HP Syn. 2200 v.
100 KW 250 v. G.E.—150 HP Ind. West.
90 KW 60 v. West.—135 HP Ind. West.
75 KW 75 v. West.—100 HP West. Ind.
50 KW 125 v. G.E.—75 HP G.E. 2200 v.
40 KW 250 v. West.—60 HP West. Ind.
15 KW 125 v. Wotten—25 HP 220/440 v.
10 KW 125 v.—15 HP Master 220/440 New.
7½ KW 250 v. West.—15 HP West. Ind.

AC AND DC GENERATORS

45 KW 250 v. S West. 1000 RPM
60 KW 60 v. 1000 amp. West SK Welding
2 150 KW West. SK 125 v. 1200 RPM
300 KW West. 250 v. 1200 RPM

AIR COMPRESSORS

1100 cu. ft. 100 lbs. Chg. Pneu. 2 stage, 19" & 12"x12" with Intercooler, aftercooler, unloader, air receiver dir. conn. 215 HP West. Syn. Motor 2200 v. 3 ph. 60 cy. 257 RPM with belted 8 KW SK West. exciter and manually operated starting panel. Good condition. Immediate shipment.
750 cu.ft. 100# pres. Chic. Pneu. 2 stage Type OCB 17 & 10 x 12"
356 cu.ft. 100# pres. Chic. Pneu. 12 x 10
245 cu.ft. 100# pres. Ing. Rd. ER1, 10 x 10
175 cu.ft. 100# Pres. Chic. Pneu. 9 x 8
164 cu.ft. Ch. Pneu. Steam Type

AC MOTORS (3 ph. 60 cy.)

HP.	Make	Wdg.	Spd.	Type
600	G.E.	S.R.	900	MT
450	G.E.	S.R.	257	I M
300	West.	S.R.	600	CW
300	G.E.	S.R.	450	I M

300	West.	S.R.	1750	CW
250	Al. Ch.	S.R.	600	
150	G.E.	S.C.	435	I K
150	G.E.	Syn.	720	TS
150	G.E.	Syn.	600	ATI
125	West.	Syn.	277	
100	G.E.	S.R.	450	I M
80	G.E.	S.R.	900	MTC
75	West.	S.C.	450/900	CS
75	G.E.	S.R.	600	I M
75	G.E.	S.R.	575	ITC
75	Al. Ch.	S.C.	900	
50	G.E.	S.C.	900	IK
50	West.	S.R.	600	CW658 D
50	G.E.	S.R.	900	I M
50/12½	G.E. 2200 v. S.R.	900/450	I M	
25	Cr. Whl.	S.R.	580	
25	Cr. Whl.	S.C.	860	

LOCOMOTIVES

Haulage and Gathering Locomotives

20 Ton Jeff. & G.E. 550 v. 42" Ga.
(Can be rewound 250 v.)
13 Ton West. 260 v. 36 or 40" Ga.
8 Ton Goodman Exploring tested 500 v. 42/44".
6 Ton West. 250 v. 904 Motors 36" Ga.

STORAGE BATTERY LOCOMOTIVES

6/7 Ton Jeffrey 42/44" Ga. BB Motors.
6 Ton G.E. perm. 36/44" Ga. HM 825 BB
5½ Ton Ironton Type A 36/42 Ga.
CE 7 Sullivan 250 v. 6' cutter bar.

DC MOTORS

HP.	Make	Voltage	Wdg.	Speed
15	West. SK 110	230	cp.	750
15	West. SK 83	230	cp.	950
15	Cr. Wh. CM	230	sh.	1400/1700
20	West. SK70L	230	cp.	1750
20	CR. Wh. CMC	230	sh.	1200/1700
20	G.E. DLC	500	sh.	400/1200
20	West. SK 110	230	sh.	900
25	West. S	230	sh.	325/975
25	West. K5	230	ser.	500
25	West. SK 113	230	cp.	900
30	West. SK 93	230	sh.	1750
40	G.E. RC 34	230	sh.	750
50	West. S	230	cp.	875

60	Rel. T461	230	sh.	800/1200
125	West. SK 193	230	sh.	450/1000
375	West.	230	cp.	430/860

ENGINE & TURBINE UNITS

50 KW West—Turbo 125 v.
75 KVA G.E. 110/220/440/3/60 1200 RPM
G.E. Diesel Eng. auto control.
300 KW West. 125/250 v. DC—West. Turbine 440# Pres.
2-400 KW G.E. 250 v.—Skinner Steam Eng.

HOISTS, CRANES AND PUMPS

400 HP Vulcan conical drum shaft Hoist.
400 HP Vulcan single fixed cylindrical drum 78" dia. 5' 4" wide—AC Motor.
150 HP Diamond sgl. fr. drum—AC Motor.
75 HP Mead Morrison sgl. fr. drum—AC Motor.
1—50/75 HP 2 drum Meade Morrison slope.
40 HP Ligerwood sgl. fr. drum geared to A.C.
25 HP sgl. friction Hoist—230 v. DC Motor.
15 HP Ottumwa sgl. fr. tdr.—15 HP. SK 230 v.
10 Ton Larry Car. 500/250 v. DC.
10 HP Fridy Car Puller, AC Motor.
4—10 Ton Chisholm Moore Chain Hoists.
Lawrence Cent.—50 HP, AC Motor.
Gardner Cent.—50 HP, 230 v., DC Motor.
Weinman Cent.—50 HP, 230 v., DC Motor.

TRANSFORMERS

Qu.	KVA	Make	Prim. V.	Sec. V.
3	200	Pgh.	2200	220/440
3	150	Westgh.	2200	220/440
4	15	Penna.	2200	110/220
5	10	Penna.	2200	110/220
3	10	West.	2200	110/220

DC MAGNETIC STARTERS

3—10 HP 230 v. Mag. Rev. Dyn. Braking.
1—25 HP C.H. 230 v. dripproof.
4—30 HP EC & M. 230 v. Magnetic.
3—40 HP W.L. 230 v. dripproof.
4—60 HP C.H. 230 v. dripproof.
4—75 HP C.H. 230 v. dripproof.
1—100 HP C.H. 230 v. dripproof.
1—150 HU C.H. 230 v. dripproof.

AC MAGNETIC STARTERS

6—43¼ Clark Mche. Tool 440/3/25 cy.
2—700 HP West. 220/3/60 Line Starters.

MOTOR GENERATORS

500 KW G.E. SYN. 275 V. 2300/4000 V.
3PH. 60 CY. 900 RPM. COMPLETE MAN-
UAL SWITCHGEAR.

500 KW G.E. SYN. 575 V. 2300/4000 V.
3PH. 60 CY. 900 RPM. COMPLETE MAN-
UAL SWITCHGEAR.

400 KW WEST. SYN. 575 V. 2300/4000 V.
3 PH. 60 CY. 720 RPM. COMPLETE MAN-
UAL SWITCHGEAR.

300 KW G.E. SYN. 275 V. 2300/4000 V.
3 PH. 60 CY. 720 RPM. COMPLETE MAN-
UEL SWITCHGEAR.

250 KW G.E. SYN. 275 V. 2300/4000 V.
3 PH. 60 CY. 720 RPM. COMPLETE MAN-
UAL SWITCHGEAR

SYNCH. CONVERTERS

300 KW G.E. 275 V. 6 PH. 60 CY. 1200
RPM. Pedestal Type. 2300/4000 V.
TRANSFORMERS and SWITCHGEAR.

300 KW G.E. 575 V. 6 PH. 60 CY. 1200
RPM. Pedestal Type. 2300/4000 V.
TRANSFORMERS and SWITCHGEAR.

LOCOMOTIVES

13-T Jeffrey 250 V.MH-110Mts. 42"-32" Ga.
10-T Jeffrey 250 V.MH-110Mts. 42"-32" Ga.
10-T West. 250 V. 907-C Mts. 36"-44" Ga.
8-T West. 250 V. 906-C Mts. 42"-48" Ga.
6-T West. 250 V. 903-B Mts. 22"-32" Ga.
6-T G.E. 250 V. HM-701 Mts. 22"-32" Ga.

Each unit listed above is owned by us and
is available now for immediate purchase.

WALLACE E. KIRK CO.

501 Grant Building Pittsburgh Pa.



M-G SETS—AC to DC

150 KW Cr. Wh. DC 250 V., synch. motor 440 V.
100 KW Allis Ch. DC 125 V., synch motor 2300
V., AC & DC panels.
100 KW whse. rotary converter 250 V. DC output.
80 KW Star DC 250 V., synch. motor 440 V.

D.C. MOTORS—230/250 V.

150 HP Cr. Wh. b.b. TEFC 890 RPM (2).
100 HP Whse. SK 181 450/900 RPM.
50/60 HP whse. SK 160 550/1100 RPM.
60 HP Whse. SK 160 750 RPM.
50 HP G.E. CD 123 850 RPM.
30 HP Whse. SK 160 350/1050 RPM.
25 HP Whse. SK 1100 RPM.
15 HP Whse. SK 850 RPM (5).

Complete Stock A.C. Motors—New and Rebuilt Up
to 500 H.P.—Sq. Cage, Slip Ring, Synch.
Special—600 H.P. G.E. slipring motor
360 RPM, 3/60/440V.

Also Pumps, Fans, Blowers
WRITE — WIRE — PHONE

ARTHUR WAGNER CO.
1433 W. Randolph St. Chicago 7
ELECTRIC MOTORS - GENERATORS

LOCOMOTIVES, Std. Gauge

1—Switcher Type, 0-6-0, Steam, 100 T.
3—Consolidation 2-8-0, Steam, 120 T.
1—Santa Fe Type, 2-10-0, Steam, 195 T.
2—Switcher Type Oil Burners, 80 T.
2—Switcher Type, Diesel Electric, 50 T.
7—18 T. Vulcan Steam, S.T. 36" Gauge.
1—10 T. Cincinnati Gas, 36" Gauge.
2—10 T. Whitcomb, Elec. Bat. 36" Gauge.
2—12 T. Whitcomb, Elec. Batt. 36" Gauge.

MINE LOCOMOTIVES

1—4 T. Jeffrey, 250 volts, 36" Gauge.
1—8 T. General Electric, 42" Ga. 250 v.
1—13 T. West. 250 volts, 40" Gauge.

COAL CUTTING MACHINES

13—Jeffrey 24L, Long Wall, 250 v. permissible.
1—Goodman Universal, 250 v., 42" ga.

CARS

100—Sanford-Day Drop Bottom, R.B. 36" Ga.
41—5 Yd. Western side dump wpool, 36" Ga.

MOTOR GENERATOR SETS

1—75 KW Star, 250 D.C. 3/60/440 A.C. Syn.
1—75 KW C-W 250 D.C. 3/60/440 A.C. S.C.
1—750 KW C-W 250 D.C. 3/60/2300 A.C. Ind.
1—250 KW C-W 250 D.C. 3/60/2300 A.C. Syn.
1—300 KW West. 250 D.C. 3/60/440 A.C. Syn.
2—350 KW G.E. 250 D.C. 3/60/2300 A.C. Syn.
1—500 KW G.E. 250 D.C. 3/60/2300 A.C. Syn.
1—500 KW West. 250 D.C. 3/60/2300 A.C. Syn.

ROTARY CONVERTERS

1—100 KW West. 250 D.C. 6/60/440—189 Trans.
2—200 KW West. 275 D.C. 6/60/2300—206
Trans.

WE BUY GOOD USED MACHINERY

SOUTHERN ENGINEERING CO.
215 McFarland Avenue, Chattanooga 5, Tenn.

Electrical Equipment

Converters, Motor Generator Sets, A. C. & D. C. Motors,
Control Equipment and Transformers.
We build equipment to fit your requirements. Over 25 years
engineering background.

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INDUSTRIAL BLOWERS AND
VENTILATING FANS

AXIAL FLOW VENTILATING FANS

5-50" dia. 72 1/2" long. 2 sets of propellers, 8 blades to each. Dim. of blade 14"x9 1/2" curved mfg'd by International. Size 114, driven by 100 HP., 1750 rpm., 220/440 v. 3 ph. 60 cy. A.C. Motor.

6-16000 CFM Buffalo Forge Co., 3" stat. pres. 1800/1200 rpm. con. 15/4.5 HP., 1710/1150 rpm., 3 ph. 60 cy. G.E. A.C. Motor 220/440 v. totally encl.

2-12000 CFM 3" stat. pres. Sturtevant with dir. con. 10/3 HP., 1775/1180 rpm., 220/440 v. West. CS. TEFC Motor.

1-7500 cfm Clarage with dir. con. 7 1/2 hp., 1750 rpm., 3.3 hp at 1160 rpm., 220/440 v. 3 ph. 60 cy.

2-6000 cfm. Sturtevant 1.65" stat. pres. dir. con. 2.7/8 hp 220/3/60 A.C. Motor.

31-6000 cfm. Sturtevant Bulletin 512389, 3" stat. pres. 7 blade, dir. con. 5/1.5 HP., 1765/1175 rpm., 220/440 v. 3 ph. 60 cy. West. TEFC Motors.

2-5000 cfm Sturtevant 1.8 stat. pres. 4.2/1.25 HP., 1750/1150 rpm., 3 ph. 60 cy., 220/440 v. ball bearing motors.

2-4000 cfm 3" stat. pres. Sturtevant dir. con. 2 speed, TE Westinghouse 220/440 v. Motors.

1-4000 cfm 3" stat. pres. Sturtevant Axial Flow vent fan dir. con. 4/1.2 HP., 1750/1150 rpm., 220/440 v., 3 ph. 60 cy. Tot. Enc. West. Motor.

115 Volt. D.C.

8-4000 CFM Sturtevant 3" stat. pres. 115 v. Westinghouse SK Motors.

4-4000 cfm American Blower 3" stat. pres. 4/1.7 HP., 1750/1310 rpm., 115 v. Westinghouse SK Motors.

1-3000 cfm 3" stat. pres. B. F. Sturtevant 1750 rpm., dir. con. 3/1.25 HP., 115 v. D.C. Motor.

1-250 CFM-2 1/2" stat. L. J. Wing, with dir. con. 1/5 HP., 3300 rpm. Diehl Motor.

230 V. D.C. MAGNETIC STARTERS AND CONTROLLERS

- 456-New, 1 HP. Cutler Hammer across the line.
- 111-New, 1 HP. Cutler Hammer across the line.
- 30-New, 2 HP. Cutler Hammer across the line.
- 55-New, 5 HP. Cutler Hammer drip proof 2 step current limit OL and LV.
- 58-New, 7 1/2 HP. Cutler Hammer.
- 60-10 HP. Cutler Hammer Magnetic.
- 12-10/15 HP. 230 V. Westinghouse Magnetic Drip Proof Controllers, 2 steps acceleration thermal overload relay with stop, start and reset buttons.
- 9-New, 10/15 HP., 230 v. G. E.
- 10-New, 20/35 HP., 220 v. Ward Leonard Magnetic.
- 10-New, 40 HP., 230 v. G.E. Magnetic.

A.C. MOTORS 4000/2200/220/440 V.—3-Ph., 60 Cy.

No.	HP.	Make	Rpm.	Type
-----	-----	------	------	------

1	500	Elec. Mach.	120	Syn.
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PUMPS WITH A.C. or D.C. MOTORS

Qua.	Gpm.	Head	Kind	Make
3	1200	300	Cent.	Worthington
3	1100	323	Cent.	Worthington
3	1000	336	Cent.	Worthington
3	900	365	Cent.	Worthington
3	800	378	Cent.	Worthington
3	800	150	Cent.	Worthington
3	735	161	Cent.	Worthington
3	665	168	Cent.	Worthington
3	600	182	Cent.	Worthington
1	600	105	Cent.	Dayton Dowd
1	600	100	Cent.	Morris
1	532	189	Cent.	Worthington
1	500	115	Cent.	Dayton Dowd
1	500	123	Cent.	Morris
1	450	40	Cent.	Gardner Denver
1	400	50	Cent.	Dayton Dowd
1	400	140	Cent.	Morris
1	335	60	Cent.	Dayton Dowd
1	300	145	Cent.	Morris
1	300	125	Cent.	Dayton Dowd
1	244	60	Cent.	Dayton Dowd
1	210	60	Rotary	Nat'l Transit
2	200	125	Cent.	Worthington
1	200	72	Cent.	Morris
1	200	125	Cent.	Dayton Dowd
2	180	150	Cent.	Worthington
8	180	10	Cent.	Allis Chalmers
8	170	12	Cent.	Allis Chalmers

D. C. GENERATORS 250 V. D.C.

No.	KW	Make	Speed
3	250	West.	1200
1 New	135	G.E.	1200
2	100	West.	720
1	100	G.E.	900
1 New	100	Elliott	900
4	100	West.	900
2	100	Delco	1260

MOTOR GENERATOR SETS 250 V. D.C.

Motors 220/440 or 2200 v. 3 ph. 60 cy.

No.	KW	Make	Speed
1	150	West.	1800
1	135	G.E.	1200
1	100	West.	1800
2	100	Delco	1150
2	75	West.	720
1	50	Cr. Wh.	900
2	50	West.	490
1	40	G.E.	720
3	40	West.	900
1	40	G.E.	1750
1	35	G.E.	850
1	30	G.E.	680
1	30	West.	850
1	25	West.	1150
1	20	G.E.	1150
2	20	Delco	1200
2	15	West.	1800
1	5	West.	1150

ENGINE GENERATOR SETS

- 10-NEW 1 kw 14.25 v. D.C. and 2 kw., 28.5 v. D.C. Homelite portable gas eng. Gen. sets. Can furnish lamps and batteries. Suitable for farms and camps.
- 3-5 kva. 120/240 v. 1 ph. 60 cy. Witte Diesel.
- 1-10 kw., 115 v. D.C. 1200 rpm., Hercules DIESEL.
- 30-NEW 25 kva. West. 120/208 v. 1 and 3 ph. 60 cy. LeRoi GAS.
- 1-35 kva. 220/440 v. 3 ph. 60 cy. 257 rpm., Ridgeway STEAM.
- 3-100 kw., 240/120 v. Delco 1200 rpm., dir. driven by 150 HP. Superior GBD-8 5 1/2"x7" 8 cyl. DIESEL.
- 1-125 kva. G.E. 220/440 v. 3 ph. 60 cy., dir. con. Skinner UNIFLOW Engine.

HOISTS or WINCHES

- 200-1 1/2-ton Hand Cranked ratio 27:1 thru an enclosed double reduction gear unit with 4 planetary gears mounted on steel plate complete with 48' of 1/4" cable, ratchet type brake, push button release.

CAR PULLERS

- 100-Brand New with 1/4" cable, 1 1/2 and 2 ton A.C. or D.C. Motors.

TRANSFORMERS

- 20-NEW 25 kva. 460 v. pri. 230/115 v. sec. 1 ph. 60 cy. Allis Chalmers.

SPECIAL BARGAIN AIR COMPRESSORS

- 7-240 CFM Westinghouse type 3 VS-23 3 cyl. vert., 150 lbs. pres. dir. con. to 50 HP., 220/440 or 2200 v. 3 ph. 60 cy. West. Slip Ring Motors, auto. Control. Can furnish D.C. Motors or Oil or Gasoline Engines if desired.

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DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH (6), PA.
Montrose — 5800

LOCOMOTIVES & CRANES

- 80 ton Lima 6 wheel Switchers. New 1944.
- 65 ton Whitcomb Diesel-Electric. New 1944.
- 50 ton Gen. Elec. Diesel-Electric.
- 70 ton Porter Fireless steam locomotive.
- 30 ton Plymouth Gas Locomotive. New 1944.
- 2 yd. Lima Diesel Crawler Crane. 100' bm.

MISSISSIPPI VALLEY EQUIPMENT CO.

511 Locust St.

St. Louis, Mo.

FOR SALE

- 2-Cutler Hammer Bull. 5110. 30-50 HP, 230 v. DC., reversing drum controllers with grid resistors.
- 1-75 HP, KT, 220/440/60/3/900 rpm, sq. cage.
- 1-75 HP, CS, 220/440/60/3/1200 rpm, sq. cage.
- 1-150 HP, GE, IE, 2200/4000/60/3/1800 rpm, sq. cage.
- 1-200 HP, GE, I-M, 2200/60/3/600 rpm, slip ring.
- 1-100 HP, GE, I-M, 2200/60/3/690 rpm, slip ring.
- 1-300 HP, GE, I-M, 2200/60/3/440 rpm, slip ring.
- Many other items available. Pumps, hoists, MG sets, etc. Send me your inquiries.
- E. P. DIETRICK
- 829 Richmond Street Scranton 9, Pa.
- Phone 3-7357



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Amazingly simple to install and operate. Just hook up terminals of two or more phones to any 2-strand wire and you are ready to talk! Up to six phones can be used on single line without a switchboard. Compact, rugged, portable. Originally cost government \$39.90 each. Hundreds of uses for quick, low-cost, dependable 2-way communication on-the-job... from office to scattered mining units... on the surface or underground. Promotes safety... saves man-hours. Powered by standard flashlight batteries. No maintenance required. Each phone complete with self-contained hand-operated ringer. Performance equals present-day commercial telephones. Every phone checked for perfect operation and fully guaranteed!

NOW AS LOW AS \$7.45 EACH

- USED—good, serviceable condition.....\$ 7.45 ea.
- USED—excellent condition..... 8.95 ea.
- RECONDITIONED—(by U.S. Signal Corps)... 10.75 ea.
- NEW—(Unused but soiled)..... 10.75 ea.
- BRAND NEW PHONES—canvas case..... 15.00 ea.
- BRAND NEW PHONES—mig. by Western Electric, Stromberg Carlson and Kellogg, with canvas case..... 16.75 ea.
- NEW WESTERN ELECTRIC HANDSETS (postpaid)..... 4.75 ea.
- WIRE—UNUSED W-110-B two-strand ARMY FIELD WIRE—500 ft., \$3.50; 1000 ft., \$6.50. (One-mile reels also available at \$20.00.)

BRAND NEW SWITCHBOARDS

- For systems of six to 24 phones, use ARMY FIELD TELEPHONE SWITCHBOARDS:
- NEW—BD-71, 6 drops, \$32.50 ea.
- NEW—BD-72, 12 drops, \$65.00 ea.
- NEW—BD-72, with outer cases soiled.....\$45.50 ea.

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MINING MACHINES

Jeffrey: 2-35B, 28A, 250 V. 1-24B Low Vein, 4-29B, 29C, 29CE with shearing head. Also 1 on cats. Revolving head for 29C. 2-Longwall 24B.
Goodman: 12A, 12AB, 12AA, 12G3A, Shortwalls, 24B, 124 EJ Slabbers, 1-12G3, 220 volt and 2-12 DA, 2 DA, 500 volt.
 2-Permissible Type 12CA, 6-112AA. Motors for 212 G3-Volts 220, Phase 3.
 1-Hitch Cutter for Cross Head timbers.
 2-Goodman Slabbing Machines, permissible type, 250 and 500 volts.
Sullivan: CE7, CE9

SUBSTATIONS—275 volts, D. C.

1-75 KW GE Rotary Converter—25 volt DC transformers—220-440—2300/4000.
 1-300 KW W.H. 3-phase Converter—275 DC transformer 4000/6600 AC.
 1-100 KW W.H. MG Set 275 DC, 2300 volt AC.
 1-100 KW, GE MG Set 275 DC, 440 AC in portable building.

LOCOMOTIVES

Goodman: All 250 volts.
 1-6 ton, 30 B 43" 1-5 ton 2600 R.
 1-5 ton 8-30 36" gauge.
 1-6 ton type 8A.
 1-5 ton type 42-0-4-2.
Westinghouse: All 250 volts.
 906 motors and 102-904-115.
 Bar steel frames 10 ton, 6 ton, and 4 ton.
G.E.: All 250 volts.
 6 ton 803, 44" as is.
 6 ton 823, 44".
 6 ton 801.
 8 ton 839.
 1-8 ton type HM 61.
 6 ton 819-821.

LOCOMOTIVES

5 ton 825, 44" and 36".
 8 ton 839.
 2 motors for 8 ton 839.
Jeffrey: 8 ton, 250 volts, type MH73, 1-4 ton MH 12, Locomotive motors and Crabs and Reels for Locomotives.

SPARE ARMATURES

Jeffrey: MH110, MH78, MH73 and MH64-350 V. and 500 V. 29B, 35B and 28A, 35BB, 35A, 29C, 29L, 35L.
Goodman: 30B, 30C, 12A, 12AB, 12AA, 32-1-4-T, 32-1-2-T, 32-1-4-T.
General Electric: 801, 819, 821, 825, 839, 61.
Westinghouse: 904, 905, 102, YR2, 115.
 250 V. Bracket Type, 150 KW G.E. HCC Bracket Type.
Sullivan: CE7, CE9 and CE10.

OTHER ITEMS AVAILABLE

Aerial Tramways.
Automat Loader: 1 Myers-Whaley #4.
Belt Conveyors: 1 Bucket Elevator Conveyor.
Bit Sharpeners: 2 Sullivan, 1 Diamond.
Blue Print Machine: 42" wide, continuous Mercury Arc Light.
Bond Welders: Resistance.
Circuit Breakers: AC and DC.
Circuit Breakers, Automatic: 250 volt, 600 amps.
Circuit Breakers, Manual: 600 amps to 3000 amps.
Clam Shell Bucket: 1 1/4 cubic yard.
Coal Crushers: (double roll) 16"x16", (single roll) 24"x24", 30"x30", 18"x18", 12"x16".
 1-Pulverizer 30" Williams #3 Coal Crusher.
Conveyors: Scraper type.

OTHER ITEMS AVAILABLE

Compressors & Jackhammers, Compensators.
Drop Bar Supports: (Gooseneck) 29B and 29C.
 1 Revolving head for 29C.

Dumps: Crossover.

Field Frames.
Generators: DC 250-275 volt, 30 KW to 100 KW.
 1-AC Generator, 31.3 KVA, 3 ph. 208 volt, General Electric with Exciter.
Hoists:
Hoists, overhead: AC 3-60-400 1 ton and 2 ton. Crabs and Room Hoists.
Lathes: 48"x14" with Taper Attachment and 3-60-220 Motor.
Loading Machines: 2-Myers-Whaley #3 and 4. 1-4BU Joy loading machine. 1-12BU Joy loading machine.
Milling Machines: horizontal and vertical.
Mining Machine Trucks and 2 on catts.
Motors: Miscellaneous and 1-50 HP Fynn Weichsel, 1800 RPM, 220 Volt, Slipring for synchronous Crane type. 1-oilwell motor, 2 speed 575 and 1160-HP. 15' and 36', 440 volts. Slip Ring with control and pole changer and series motors.
Motor Starters and Controllers: AC and DC. Synchronous Motor Starters, full magnetic, across the line. 3-60-4150, 2-200 H.P. and 7-250 H.P. 1-165 H.P., 440 volt for slip ring motors. 1-100 H.P., 250 volt D.C. Both reversible. Reduced voltage starters.
Plants: Diesel Power.
 Belting 400 Ft. 25".
 Pulley Flat-belt-V and conveyors.
Pumps: Rebuilt and New.
R. R. Switches: 85#, 100# and 60#, 60# steel rail.
Scales: Mine Car and Truck.
 1-Slate Larry.
 1-Car haul trip maker.
Transformers: 4-55 KVA 23,100/12,000 to 103/208. 3-35 KVA, 22,000/12,000 to 178/89 volts. 3-100 KVA 6600/12,000 to 2300.
Welder: 1-50 KVA Spot Welder 220 volt, 15" throat with electronic timer vacuum tube type, water cooled, air operated. Price \$600.00 f.o.b. Logan.

GUYAN MACHINERY COMPANY, Logan, W. Va.

LOCOMOTIVES

80 TON WHITCOMB DIESEL ELEC.
 2-65 TON WHITCOMB DIESEL ELEC.
 2-25 TON G.E. DIESEL ELEC.
 16 TON VULCAN GASOLINE
DARIEN CORP., 60 EAST 42nd ST., N.Y. 17, N.Y.

BRAND NEW—IN ORIGINAL CARTONS

Westinghouse Blasting Galvanometers Type PX-12

Complete with plug and leather carrying case. Ag. Cl. battery. Regular list, \$17.00. While they last—**Our price—\$9.95.**

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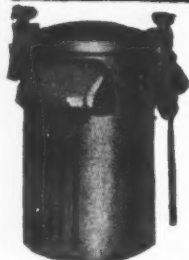
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 CAPACITY 300,000 LBS.

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STEEL TUBING FOR SALE

188,000 Lbs. 4.895" O.D. x 1.073" Walls, 36 5/8" Lengths, New Tubing. SAE 4340.

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FOR SALE

1-100 K.W. Westinghouse Generator D.C., 250 volts, 550 RPM.
 1-Jeffrey Traylor Vibrating Screen size 4'x8'.
 3-Westinghouse Transformers 75 KVA, Type S, Single Phase, 60 Cycle, Volts 2200—220—440.
 1-Westinghouse 75 HP. Slip-ring induction Motor. Type C.W., 720 RPM, 3 Phase, 60 Cycle, 220—440 Volts.
 2-Westinghouse 25 HP. Slip-ring induction Motors. Type C.W., 900 RPM, 3 Phase, 60 Cycle, 220—440 Volts.

We have various types of mining equipment and a large stock of motors both A.C. and D.C.

DUGGER TIRE & ELECTRIC SERVICE
 DUGGER, INDIANA

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CRANES-MOTORS and ELECTRICAL EQUIPMENT

ENGINEERED AND REBUILT BY SPECIALISTS IN OUR MODERN PLANT

SQUIRREL CAGE MOTORS 3-PHASE, 60-CYCLE					
Qu.	HP.	Make	Type	Volts	RPM.
1	20	G.E.	I-K	220	565
1	20	Whse.	CS	550	1740
2	25	G.E.	KT-332	220	865
1	25	G.E.	I-K	550	900
1	30	Whse.	CS	550	900
1	40	G.E.	I-K	440	900
1	40	F.M.	H-12-D	220	860
2	40	Al. Ch.	AR	440	860
1	50	G.E.	I-K	440	695
3	50	Whse.	CS	440	690
1	50	F.M.	H-16-A	440	900
1	50	Al. Ch.	AR-220D	440	1155
1	50	Ideal	AT-445	440	1750
1	60	Whse.	CS-607	440	800
1	75	Whse.	CS	440	1750
1	75	Al. Ch.	AR	2300	1765
4	100	F.M.	BS	440	880
2	100	G.E.	RT-556	2200	865
1	100	Whse.	CS-760	2300	1170
1	100	G.E.	K-544	2300	1175
1	100	Al. Ch.	AR	2200	1100
1	100	G.E.	I-H	440	1000
2	125	Al. Ch.	AR	440	435
2	125	C.W.	126Q	440	430
1	125	Whse.	CS-761	440	1750
2	125	Al. Ch.	AR	2200	1750
1	150	G.E.	H-637	2200	1785
1	250	Whse.	CS	2200	1160

SLIP RING MOTORS—CONSTANT DUTY

3-PHASE, 60-CYCLE					
Qu.	HP.	Make	Type	Volts	RPM.
2	5	Al. Ch.	ARY	440	680
1	7½	G.E.	MT	550	870
1	10	Howell		440	600
1	15	G.E.	MT-322	440	845
1	15	Whse.	HF	440	1150
2	15	G.E.	I-M	220	1125

1	20	G.E.	MT-326	220	850
4	25	G.E.	MT-526	440	840
1	25	G.E.	MT-332	2200	850
1	25	Al. Ch.	ARY	2200	860
2	25	Whse.	CW-4810	220	1750
1	30	Whse.	CW	440	1160
1	40	Al. Ch.	ARY	2200	435
3	40	G.E.	MT-346	550	560
4	40	G.E.	I-M	600	1170
1	50	Al. Ch.	ARY	2200	490
2	50	G.E.	MT-536	2200	1150
1	75	G.E.	MT-548	440	1200
1	125	Al. Ch.	ARY	440	900
1	150	Whse.	CW-954	550	490
1	150	G.E.	I-P	440	1180
1	150	G.E.	I-M	2200	1750
1	300	Al. Ch.	ARY	2200	505
1	300	G.E.	I-M	2200	1200
1	400	Al. Ch.	ARY	2200	505
1	400	G.E.	I-M	2300	875
1†	600	G.E.	MT-412Y	2200	720
1†	750	G.E.	MT-414Y	2200	720
1†	800	Al. Ch.	ARY	2200	440
1†	1200	Whse.	CW	2200	590

* 40-Cy. † Mill Type 2-Pedestal bearing on cast iron base, complete with REVERSING PRIMARY and MAGNETIC SECONDARY CONTROL. Will supply any above motors with control ENGINEERED for your requirements.

SYNCHRONOUS MOTORS

3-PHASE, 60-CYCLE					
Qu.	HP.	Make	P.F.	Volts	RPM.
2	50	G.E.	.8	2200	600
1	60	G.E.	.8	440	1200
2	100	G.E.	.8	440	600
1	100	Ideal	.8	220	900
1	150	G.E.	1.0	2300	900
1	200	Al. Ch.	1.0	2300	360
1	885	G.E.	1.0	11400/6600	514

MOTOR GENERATOR SETS					
Qu.	KW	Make	RPM.	Volts D.C.	Volts A.C.
1	5½	G.E.	1800	250	220/440
1	9	G.E.	1800	250	220/440
7	25	Whse.	1200	120/240	220/440
3	50	Whse.	1200	120/240	440/2300
2	35	G.E.	1800	125	220/440
1	50	Lo. Al.	1200	120/240	440/2200
1	75	Whse.	1200	125	220/440
1	75	Al. Ch.	900	250	220/440
1	100	Al. Ch.	900	125/250	2200
3	150	C.W.	1200	300	440/2200
1	200	G.E.	1200	250	4150/2200
1	350	Whse.	720	300	4150/2200
1	500	Whse.	720	600	4150/2200

Above furnished complete with A.C. and D.C. panels and A.C. control.

TRANSFORMERS (OIL-COOLED)

Qu.	K.V.A.	Make	Voltage	PH. CY.
2	10	Whse.	2400/480/240	1 60
2*	13	Kuhlman	480/240	1 60
1	25	Al. Ch.	2500/460/230	1 60
1	30	G.E.	2200/1100/608	1 60
3*	37½	Whse.	460/230/230	1 60
			115/287	1 60
2	50	Wagner	13200/11880/575	1 60
3	50	Al. Ch.	22000/220	1 60
14	100	G.E.	4160/2300/120	1 60
3	130	G.E.	19000/9500/550	1 60
3	150	Wagner	8800/4400/2300	1 60
3	165	G.E.	11000/22000/38100/430/215	1 60
3	667	G.E.	2300/4000/460	1 60

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- 1—Link Belt 36 x 60 double roll crusher, equipped with gear drive.
- 1—American Pulverizer crusher, No. 1627. Type AC, machine number AC3B, crushes from 20" down to 1 1/2".
- 1—Jeffrey single roll crusher, size 36 x 36. No. 4507. Will crush maximum lump of 20" at rate of 250 tph to a product of 1 1/4" when operating at 300 rpm. Direct connected by flexible coupling to 75 HP. GE motor. 3/60/440, speed full load 885, ball bearing, fan cooled.
- 1—McNally Pittsburg 30 x 54 single roll crusher.

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- 1—50 KW motor generator set, consisting of: 75 HP. Crocker Wheeler DC motor, compound wound, No. 254053, 230 volts, 273 amps, type CCM, size 50H, connected to 75 HP. Westinghouse AC motor. 220 volts, 1,170 RPM, 3 phase, 60 cycle, 166 amps, type CS, No. 1504169, complete with compensator for AC end, but no switchboard for DC end.
- 1—50 KW motor generator set, AC end 2,200 volts, DC end 250 volts, complete with compensator. Perfect condition.

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- 1—Steel tipple complete with shaker and concrete silos. Capacity 1,000 tons per day.

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All sizes and types of pumps.

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- 2—Sullivan type CH8, AC longwall mining machines. 3 phase, 60 cycle, 220 volt, 30" cutter bars, complete with 300' each of 3 conductor mining machine cable.
- 2—Goodman, Universal mining machines, type 112-G3, 36" gauge.

1—Jeffrey 35BB, AC shortwall mining machine. 6" cutter bar, complete with tip turn truck, cable and reel.

1—Goodman Universal mining machine, 112AA, 42" gauge, 250 volts, DC, 8" cutter bar.

1—Sullivan 7B AC shortwall mining machine, 3 phase, 60 cycle, 220 volts.

1—Sullivan CLE 5 Longwall mining machine. 220 v. AC.

HOISTS

1—Ottumwa Iron Works single rigid cylindro-conical drum hoist, serial number 4080, complete with remote control and hydraulic brakes, constructed for following hoisting conditions: Weight of cage, 6,000 lbs., weight of car, 1,600 lbs., weight of coal average 2,500 lbs., total cage travel 277 ft. (HMD) size of rope 1 1/2", trips per hour 78, rest period 15 sec. Balanced hoisting without slack rope, end lift. Post brake 72" diameter, 8" face. Direct connected to Western Electric 150 HP motor. 3 phase, 60 cycle, 440 volts, slip ring speed full load 700 RPM, complete with automatic switchboard.

1—Ottumwa Iron Works single friction drum hoist, serial number 3846 driven by double reduction gears. Built for 7000 pounds of rope pull with rope speed of 250 ft. per minute. Equipped with a drum 48" diameter, 26" face not grooved, 60" diameter band brake, 48" diameter Lane type band friction clutch. Drum shaft 5 7/16" diameter, intermediate shaft is 4 15/16" diameter. High speed pinion is mounted on the motor shaft. Complete with 100 HP GE motor #628725, type I-12-100A-600 form M, 3 phase, 60 cycle, 220 volts, 255 amps, speed no load 600, speed full load 570, equipped with controller and resistance.

1—Ottumwa Iron Works Hoist, serial number 3561. Drum is 48" diameter, 36" face grooved for 1" rope. Equipped with a post brake 54" diameter, hand operated. Has single reduction cut spur gears, 19 teeth and 196 teeth 1 1/4" pitch, 10" face. Drum shaft 7" diameter. Drum shaft bearings 7" x 14" pinion shaft bearings 4 1/2" x 15" of the ring oiling type. Built for the following hoisting conditions: weight of car 900 lbs., weight of coal 2500 lbs., weight of cage 3000 lbs., cage travel 250 feet, rope speed 700 ft. per minute. Built for balanced hoisting single rigid drum type, driven by single reduction gears, pinions being connected to the drum by a flexible coupling. Direct connected to 100 HP Westinghouse motor, type CW, 220 volts, 3 phase, 60 cycle, 360.8 amps, 580 RPM, #2394853 equipped with controller and resistance.

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3—GE 25 KVA transformers, 2300/4000—220/440 type H, form K.

3—GE 15 KVA transformers, 2300/4000—220/440, type H, form N.

2—GE 5 KVA transformers 2300/4000—110/220. All of the above transformers with steel shells, late type.

1—GE 100 KW syn. convertor, type TCC-6-100-1200, form P. 60 cycle, 1200 RPM, 275 volts, DC 364 Nom. amps, serial #3889193, with 3 G.E. transformers, form K, type R.R. 60 cycle, 40 KVA, volts 2070/2300, complete with switchboard.

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42"	5	1/8"	1/16"	20"	5	1/8"	1/32"
36"	6	1/8"	1/16"	20"	4	1/8"	1/32"
30"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	5	1/8"	1/16"	16"	4	1/8"	1/32"
26"	5	1/8"	1/32"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"

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es — Men-	12"	6	8"	5	4"	4
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2"	25 "	16.00
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2"	25 "	13.00
1½"	50 "	20.00
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¾"	50 "	15.00	1.50 Pair
1"	25 "	10.00	1.50 Pair
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1"	25 "	6.25	¾"	50 "	15.00
1"	50 "	12.50	1½"	25 "	10.00
1½"	25 "	7.50	1½"	35 "	14.00
			1½"	50 "	20.00

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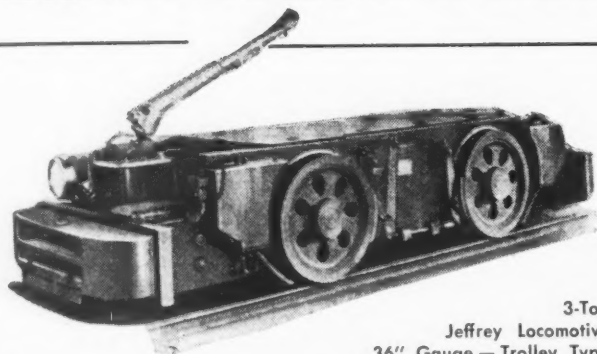
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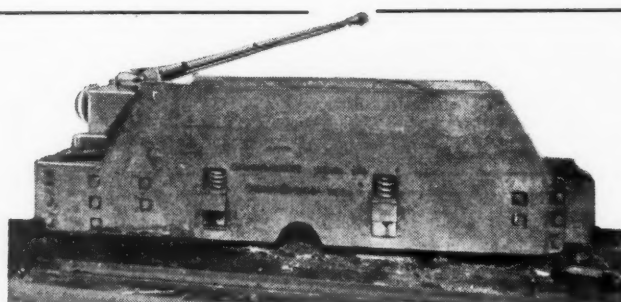
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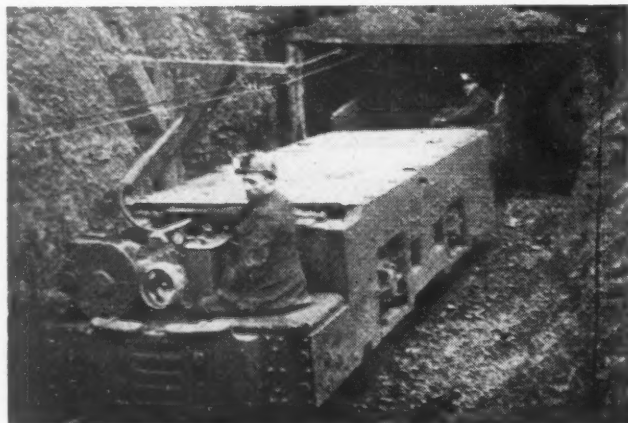
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Jeffrey Locomotive
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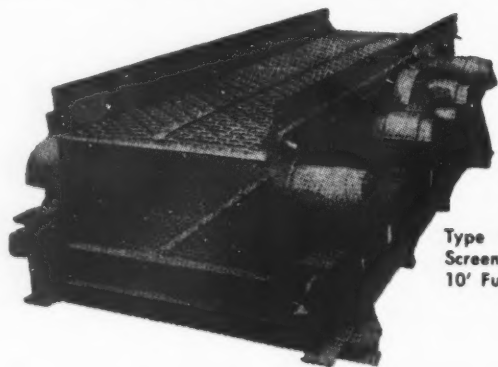
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Type F-600 Ty-Rock
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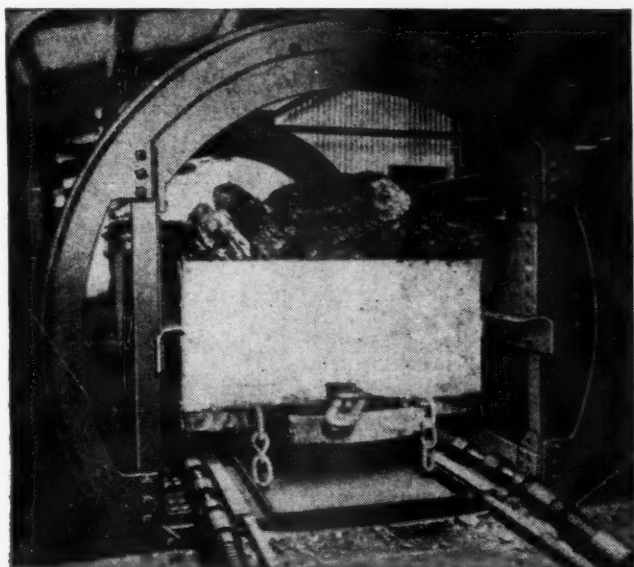
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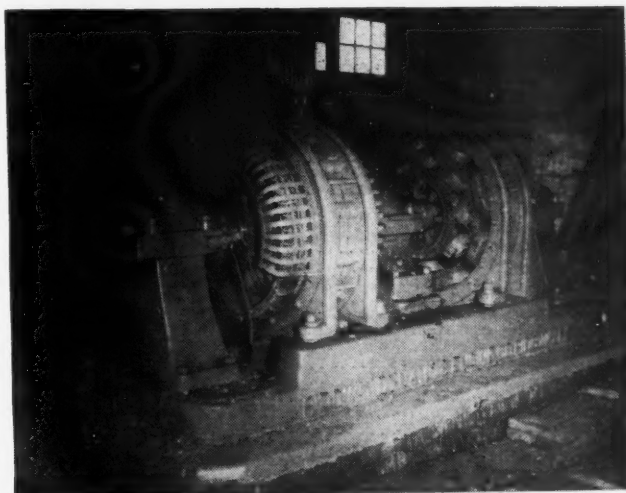
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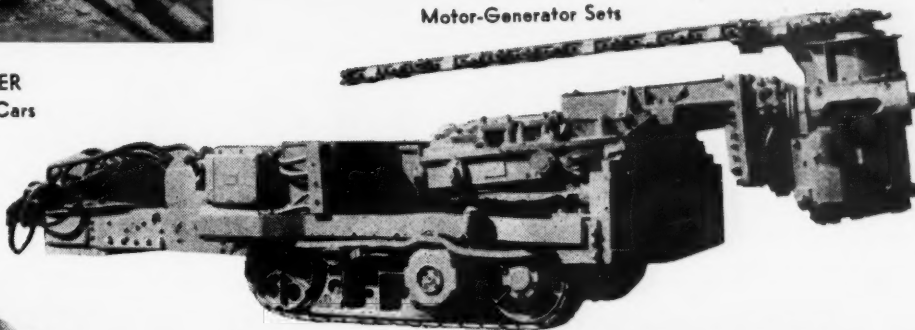
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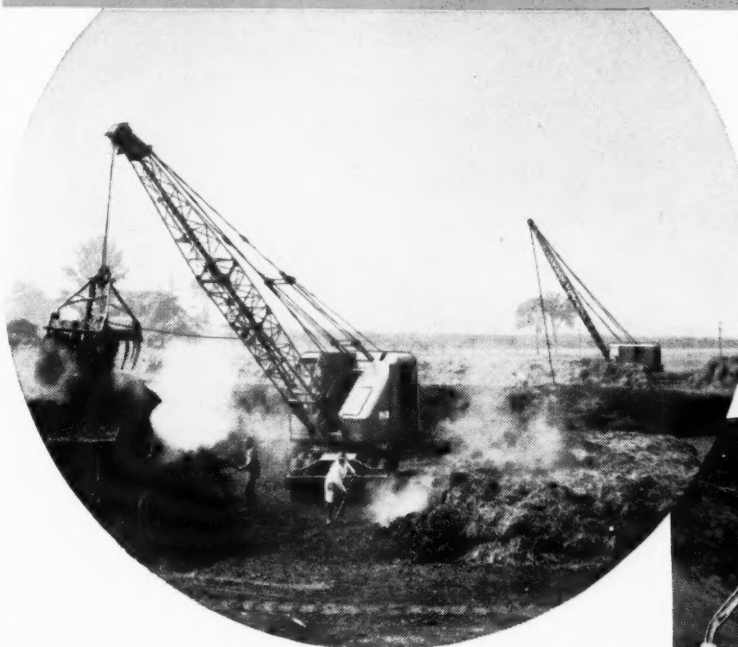
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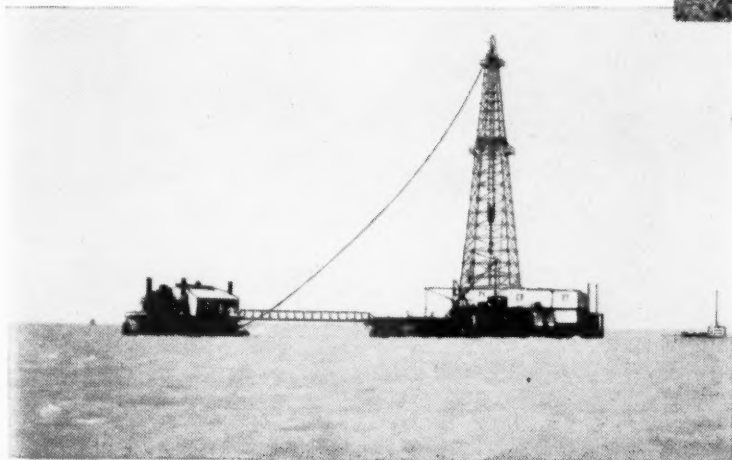
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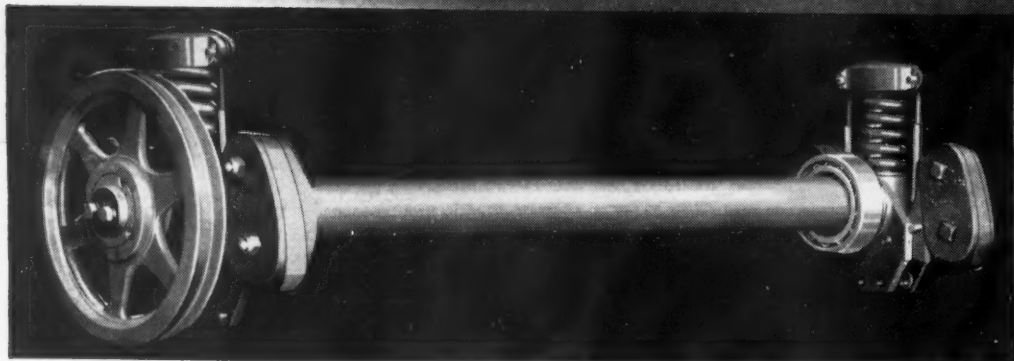
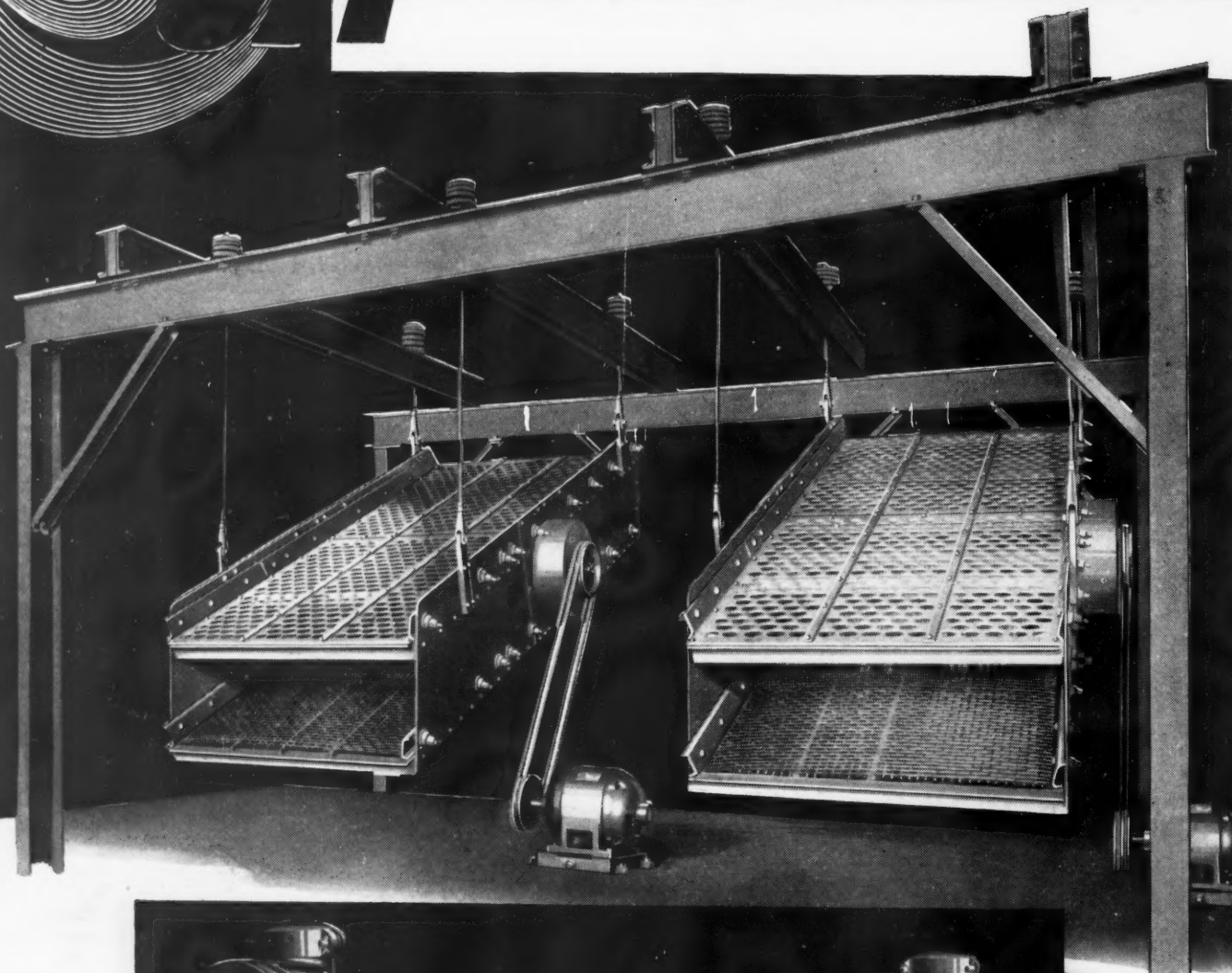


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